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Table of Contents

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TWELVE EIGHTY-

Colossal forces vie in combat such as only super-science can conceive and understand!

The sky was black with planes. They had our numbers; we couldn't even guess at theirs!

SEVEN PART ONE

A Thought Variant Epic

by JOHN TAINE

DOWN the long mahogany table Secretary Winters glanced, taking in the serious faces of the five men who had been hastily summoned to meet the President in secret conference. His own long, bony face, with its blue clean-shaven jaw and bushy black eyebrows, usually forbidding enough, was to-day sufficiently overcast to satisfy his bitterest enemy.

"Gloomy Winters," as his fellow cabinet members called the dour secretary of foreign affairs behind his back, was cordially liked by his associates, and as cordially hated by his foreign competitors, for his glum, uncompromising caution. No glib diplomat ever wormed more than a grudging "Fine day" out of the taciturn secretary of foreign affairs.

"We're all here," he rasped, as if he hated to admit even that much.

A look of mild surprise passed over the faces of the other men. The sandy-haired man with the pink cheeks and mutton-chop side whiskers at the foot of the long table spoke up:

"The President not coming?"

"No," Winters growled.

"Why not?" the other persisted.

"Doesn't want to."

The inquisitive one—Archibald Redding—secretary of commerce—subsided. Nothing was to be got out of Gloomy Winters on such a day as this. The lean man at Winters' left, whose white summer uniform and gold braid proclaimed the admiral, turned courteously to Redding.

"The President decided he needed a swim in the new pool," Admiral West explained. "Shouldn't mind a dip myself instead of sitting here sweating."

General Green looked up sharply at the suave admiral, but said nothing. As chief of staff of the army he frequently had to discipline himself to avoid speaking out his envy of the navy which was now getting all the appropriations and most of the publicity. The admiral's playful tone irritated the precise general intensely. The tight collar of his uniform suddenly grew tighter, but he held his tongue. His turn would come presently, when they got down to business. Then he could make the facetious admiral beg for a cake of ice to sit on. It remained for the meek little civilian with the shining bald head and the thick rimless glasses to pursue the inquiry.

"But I understood the President was to be here," he objected mildly. "Otherwise I shouldn't have come. There's plenty to keep me busy at the bureau," he added significantly.

Senator Atkinson, fairy godmother of the air defense, nodded his bushy white head. "Plenty!" he agreed. His blue eyes snapped, and his parrot-beak of a nose seemed to grow sharper. "And you fellows had better do it in a hurry, Dr. Lawton, if you don't want to be blown out of your beds some moonless night. They've got our number, and you can't guess theirs."

While Gloomy Winters listened in abstracted boredom, Lawton, chief of the bureau of standards, began a fluttering defense of his own fruitless efforts and those of his baffled colleagues to tell the army and the navy what they most urgently wanted to know. Senator Atkinson sat grinning like a sardonic eagle while the agitated scientist talked himself out.

"It isn't fair," Lawton concluded somewhat lamely.

"What isn't fair?" Admiral West asked sympathetically.

"All you fellows jumping on the bureau when you can't——"

"What?" the admiral challenged when Lawton stopped abruptly.

"I'll answer for him," General Green snapped, glaring at West. "Until we stop falling down on our own jobs we have no call to criticize Dr. Lawton."

Admiral West nodded. "I agree." He smiled.

"What?" Senator Atkinson ejaculated in shocked surprise. "The navy agrees with the army? Come, come, gentlemen, this will never do. Where's your fighting spirit?" He turned to Lawton. "The trouble with all you fellows"—he included Green and West in a gesture—"is that you know nothing of politics. You particularly, Dr. Lawton. All you know, doctor, is science. So you get sore when somebody gives your own pet sacred cow an impersonal kick.

"Now take Redding, here," he continued, indicating the sandy-haired secretary of commerce. "He knows nothing of gadgets, but he does know a whale of a lot about human nature. The seamy side, too. That's why he's here. And that's why I'm here, too, if you want to know. Not because I'm supposed to know all about airplanes. I don't. I couldn't tell a propeller from a fuselage.

"But what I don't know about our friends with the finest air force in the world isn't worth knowing. Would I trust them with a nickel of mine? Have I bought any of their bonds? Not I. You might—I couldn't say. For all I know you may be one of these scientific fellows who thinks the world is just one great big happy family. That's how it is in scientific research, I'm told—Germans, French, English, Americans, Russians, Swedes, Japanese, Chinese, Hindus, and all the rest, boosting one another along and not caring a whoop who gets there first.

"But this is a political conference—primarily—Dr. Lawton. Your science, Admiral West's battleships, General Green's tanks, and my own planes, are all just so much stage scenery. If we can find out what it is that our friends are really up to, we probably shan't need the tanks or the battleships. Get it?"

Lawton nodded doubtfully, somewhat dazed by the senator's emphatic speech. Gloomy Winters expressed an acid approval.

"And that, gentlemen, is why the President has gone swimming."

"Ah!" the admiral exclaimed, his face lighting up. "With the extremely distinguished foreign visitor who arrived yesterday?"

Even Winters smiled. "Those people"—he was alluding to the distinguished visitor's great nation—"are as hard to keep out of the water as fish. Shall we begin? Admiral West, what have you got?"

The admiral opened his bulky brief case and selected a sheaf of light-blue papers.

"These are the final 'analyses,'" he began, "of the maneuvers on both coasts—Atlantic and Pacific. I had better read them in full."

WHILE the admiral proceeded in a colorless tone to reel off impersonal statistics concerning imaginary losses of the defending "Blue" fleets and the attacking "Black," the others followed with the closest attention. Even the civilian scientist Lawton got the humiliating truth behind the welter of confusing technicalities—the "Blues" had come off a bad second best.

Senator Atkinson summed up the report in a word. "Smeared," he grunted disgustedly.

Gloomy Winters nodded to General Green. "You're next."

The general had recovered his professional courtesy. Only in recapitulating did he allow himself the luxury of a dig at the navy.

"Of course," he explained, "the army could do nothing after the navy let that horde of high-speed bombers through."

"Why not build swifter attack and pursuit planes?" Lawton suggested timidly. "We can, you know."

Gloomy Winters favored the hopeful scientist with a sour glance. "Tell him, Green."

General Green searched his portfolio for the simple, conclusive answer.

Finding what he wanted on two sheets of pale-green foolscap, he proceeded to rap out the short sentences like a machine gun. London, it appeared, had been unable to bring down a single plane of the "attacking" swarm in its last "demonstration"—staged to strengthen public confidence in the adequacy of the Royal Air Force as a weapon of defense against Continental invasion.

The "enemy," only slightly aided by a thinnish, unpredicted fog, had eluded the defenders, dumped his bombs, and returned to his "base" without the loss of a plane. London, theoretically, was in ruins under a blanket of gas.

Having finished with the British disaster, General Green went on to the French. It might have been compiled from the British by simply substituting "Paris" for "London," except that the French attacking force had no fog or mist as an ally.

"The French and British experts agree," the general concluded, "that attack and pursuit planes of twice the highest speed attainable at present could not have kept the enemy off. Can we build planes three, four, or five times as speedy as those we have?"

"No," Lawton admitted.

Secretary Redding spoke up: "All this publicity about the new antiaircraft guns is just publicity?"

"Call it lies," Senator Atkinson suggested softly.

"But why——" Lawton began, to be cut short by Gloomy Winters:

"Do you want our forces to die of fright in their beds before the fighting begins?"

Lawton had nothing to say.

General Green added a footnote to Redding's remark on publicity: "Speaking of publicity—to use Redding's word—the gas propaganda is part and parcel of the same stuff. We've got the civilian population pretty well trained now to believe that gas can do no real harm to a city, its inhabitants, or its defenders in the field. More publicity."

"Admiral West will agree, I think, that gas is now one of the major weapons in attack. Personally, I believe the public should know this, instead of being misled to believe that high explosives and machine guns are the only weapons capable of doing much damage. However, I'm overruled."

Senator Atkinson nodded. "Rightly, general. We've simply got to make them think that gas is easier to face and less fatal than machine-gun bullets or shell splinters. Quite pleasant, in fact," he added with a sardonic smile. "Otherwise——" He shrugged his shoulders, leaving the unexpressed alternative to the imaginations of his collaborators.

"But you experts"—he indicated West and Green—"know a fact or two we're not telling the public. It is our job to face the facts. The new gases, including some of our own, are no harmless perfumes for a lady's boudoir. Some of them are one-hundred-per-cent effective. And as for our air defense, it isn't worth a damn at present and is not likely to be within our lifetime. The attack, in an extensive air raid, has it all its own way. We have nothing to stop them. Is that so?"

Green and West nodded.

"Not if our own maneuvers mean anything," West agreed. "And I suppose we can rely on the reports of our observers in London and Paris."

"Say 'spies'" the senator suggested bluntly. "You might as well. We don't have to keep up appearances. This is no publicity test for the army and the navy. Well, Winters, what's next?"

Winters nodded to Redding. "Your report, please."

The secretary of commerce read steadily through the summarized masses of statistics covering the twelve months' period just closed, compiled in his own department and in the affiliated department of agriculture.

On its face, Redding's report was as favorable as the greediest glutton for prosperity could have wished. Since the lean year following the Great Drought, the farmers, packers, canners, and exporters, in all lines of foodstuffs, had rapidly recovered, until now all business, from agriculture and packing to sacks and tin cans, was so furiously prosperous that the overworked and highly paid laborers could barely keep up with their jobs. The business man's dream had come true—demand was fast overtaking supply, and the insatiable consumers across the water were cheerfully meeting the steeply rising prices with greater and more insistent demands. It was a report to make a secretary of commerce rub his hands in glee.

But Redding was not rubbing his palms together under the table as he read. Nor did General Green and Admiral West seem particularly pleased by the secretary's astonishing recital of peace and unbounded prosperity at last.

In closing, Redding briefly recapitulated the main steps in what the press was always jubilantly calling the Great Recovery. According to the newspaper economists, the dream of the sanguine 1920's had at last come true; the business cycle was abolished and depressions were a nightmare of the past. Prosperity had come to stay. There would never be another crash so long as the nation was a nation.

The Great Recovery had come treading on the heels of the Great Drought, crowding it out of the picture almost overnight. The incalculable tonnage of fertile soil that had been stripped from vast tracts in the great corn and wheat belts, to be blown far out over the Atlantic Ocean during the Drought, would never be missed. Science had come to the rescue.

The infertile subsoil exposed by the winds had been lifted into fertility by a thin—almost negligible—sifting of a strange, new synthetic "dust," as fine as lycopodium powder, from hundreds of airplanes pressed into service from the commercial companies or lent by the army and navy for the duration of the emergency—the emergency being starvation, or at best very short rations indeed, facing the entire population.

GOVERNMENT experts had at first been skeptical when approached by agents from an officiously friendly power. These diplomatic go-betweens divulged their purpose with the greatest frankness. Their own country, they declared, was facing bankruptcy. There was no disputing this; it was notorious the world over. To stave off bankruptcy and the revolution which must follow inevitably, their own government now sought a reciprocal trade agreement.

This, Secretary Redding emphasized, was the crux of the matter, and Gloomy Winters nodded. In the secretary's opinion, the trade treaty should never have been signed.

Senator Atkinson dissented, quite violently. "What the devil would you have done?" he demanded. "Let our people starve?"

Redding ignored the question. Glancing now and then at the mild and somewhat bewildered Lawton, whom he seemed to be subtly accusing of incompetence in his scientific work, the business-like secretary of commerce continued:

"This, gentlemen, is what we actually did. It is too late now to undo any of it. When their agents finally convinced the soil experts at the department of agriculture that the new, secret, foreign fertilizers were as phenomenally powerful as was claimed, we signed the treaty. Our experts reported that an invisible dust filmed over the surface of anything less barren than granite converted the stubborn, dead, and useless soil into a black muck richer than the richest loam. How or why this should be so they were unable to discover, and Dr. Lawton's

bureau has so far been no more successful."

Lawton murmured something, but Redding paid no attention. The time for excuses had long since gone by.

"Their next step," Redding continued, "was to lend us a full corps—I use the word intentionally—of their own experts to 'dust' our soil. And while they were about it, they did a thorough job. Our experiments at the department of agriculture had proved conclusively, to the satisfaction of every one concerned, that a 'dusting' of already fertile soil would treble or quadruple its productivity.

"Even the California oranges and the Florida grapefruit were not neglected. You know the result. The following year crops of all kinds broke all records. Our own consumers could not have disposed of a third of the stuff. The succeeding year it was still better—or worse. It depends on how you look at it. And you have heard rumors at least of what happened in Russia and Canada. I can now state that the rumors are facts. Wherever the dust was tried, the story was the same as ours. What will happen to world markets if all our competitors go in for dusting on the scale we do, I try not to anticipate."

"But surely," Lawton interrupted, "it would be all to the good! Why shouldn't every country raise all it wants and let foreign trade go hang? With this new dust we could raise all we need for ourselves off a twentieth of the land now under cultivation."

"That's what you think," Senator Atkinson cut in acidly. "All a great big happy family, eh? What about the raw materials we haven't got ourselves, and which industry must have to keep going? Our friends are going to give them away, I suppose? No! we've got to have stuff to export; and all this corn and wheat, beef and pork, that we can't eat ourselves, is just what they haven't got in sufficient quantity to feed a tenth of their people properly where we get the stuff we must have. Do you begin to see what Redding is getting at? When Canada and Russia begin dusting wholesale, as we have done, where shall we be? See it, doctor?"

Lawton nodded. "I'm not as dense as all that. Cutthroat competition for foreign markets again is what you mean, I suppose. And on top of that," he added with a defiant glance at Green and West, "the usual wars to capture the markets. We're a sensible lot, I must say."

"We are human beings," Gloomy Winters stated with a show of great precision. "That's the exact, scientific statement, Dr. Lawton. Let it go at that. Well, Redding? What has commerce got to say about it all?"

"Only this," the secretary replied: "According to the terms of our treaty with them, we send them all our surplus in return for enough dust to keep our land at maximum productivity, and they pay us the balance—already huge—in bonds to be redeemed by their government in the next ten to eighty years. They now owe us billions. How many I shall not say, or some of you might walk right out of here and dump your holdings. That would be bad for public confidence. Who has bought those bonds? In the last analysis the producers who have parted with their enormous surpluses. And will they ever collect? Not if my name is Archibald Redding. Our own people will be left holding the sack."

"But I don't see——" Lawton began, when Atkinson cut him short.

"You wouldn't. You have altogether too much faith in human nature, doctor. When our treaty with them expires—it has five years to go, hasn't it, Winters?—when it expires, I say, we shall see a sudden rise in the price of dust. I shouldn't be surprised to see it go to ten thousand dollars an ounce. Your men tell us an application of the dust is good

only for one real crop. According to what they think they have discovered, three years at the most will see the last of any beneficial effect a single application may have. Figure it out for yourself."

"That is what I have been trying to do," Redding remarked quietly. "So far as I can see, the problem has no answer. But even at that it is easier than the other."

"What's that?" Winters demanded sharply.

BEFORE replying, Redding paid his respects to the army and navy by a couple of curt nods to Green and West. "Perhaps some one can tell me," he drawled, "what the devil our friends across the way are going to do with all that food we have given them in exchange for their dust and their bonds? They have enough canned meat and cereals alone piled up now to gorge their entire population with the best on the market for a solid ten years. I'd like to have your suggestions."

Winters laughed shortly. "Anything else you'd like?"

Lawton fidgeted uneasily for a moment and then came out with his own stammering solution.

"It sounds fantastic, I know," he apologized, "but it makes sense. When the treaty runs out, and our land slips back to where it was just after the Drought, they will sell us back our stuff at their own price and redeem their bonds that way."

"Sure?" the senator quizzed. "I should think they'd more likely send it all back as a donation to the Salvation Army to hand out to our bread lines. By the way, doctor, you scientific fellows don't believe in perpetual motion any longer, do you?"

Lawton ignored the gibe. "I said my theory is reasonable and I meant it. What will they make out of the deal? Is that what's worrying you? Why, they will have kept their people fed and prosperous till all danger of a revolution has blown over. They will be over their hump."

"I wish I could get over mine," Gloomy Winters remarked. "West, what do you say?"

"I'm in the same boat as Redding," the admiral admitted. "Pulling a different oar, if you like, but still in the same boat. Our latest brilliant failure to keep 'enemy' planes from blowing our battleships to hell, and our coast cities after them, is only one of half a dozen in the past two years. Ever since they began selling us that infernal dust of theirs, it has been one damned war scare after another.

"Last month I thought we were in it surely this time. We were ready—as ready as we could be. The fleet was concentrated—playing the 'war game' officially—just where it would come in handiest in case of trouble. Their fleet, also officially just exercising, was likewise in position. A position, I need scarcely recall, that made us rather jumpy.

"Luckily the press played ball, and the civilians slept as usual. And, as General Green knows, their army was going through the most extensive peacetime maneuvers in the history of their nation. Then it all blew over, just as it has done ever since they began selling us their damned dust.

"Their fleet dispersed and their huge army went back to the fields and the factories. But the President—all of us—were expecting war within six hours at exactly this time thirty days ago. If they're trying to keep us jittery and up on our toes they win. What about it, Green?"

"They win," the general agreed. "They've got some new sort of alloy or plate metal on their land cruisers—they are all of that, huge brutes with eight six-inch guns apiece that can ramble over rough country at eighty

miles an hour—that our shells couldn't even dent. How about it, Lawton?"

Lawton nodded. "It's new."

"One of your spies slipped the sample out, didn't he?" Atkinson inquired lazily.

"The best observer we have," Green replied a trifle stiffly. "He also reported on their field tests. That's how I know our shells couldn't scratch one of their tanks."

"Has it occurred to you, general," Atkinson inquired, "that our slick friends arranged all that just for your 'observer' to see? Why, I shouldn't be surprised to hear some day that they slipped the sample Lawton has been fooling with for a year into your observer's pocket."

"You don't know what you are talking about," Green retorted angrily. "Our man is one of the shrewdest observers in the world. Any one who knows his record admits that. Apparently you never even heard of him."

"Easy, general! I was just feeling out my theory."

"Let's have it, then," Winters snapped. "I need a drink."

ATKINSON'S theory made little impression on the army and navy. "It's simply this," he said: "If war comes, it will start without a declaration."

"I could have told you that years ago," the admiral remarked rather contemptuously. "So could Green."

"So you don't think much of my little theory?" Atkinson returned with ominous good humor. "Then let me elaborate a bit. All these mobilizations of their army and navy that have been keeping you fellows so jittery for the past three years don't mean a thing. They're just so much camouflage to hide their real preparations. When they do start fighting, it will be in a way you fellows have never dreamed of.

"Your battleship, West, and your tanks and planes, Green, won't cut any figure at all. You will never get within a thousand miles—or a hundred years—of the war. You will be out of it before it starts. In fact you are out of it now. Because—take it from me—the war has started already.

"I'm willing to bet my last dollar the war began the day they sold us the first ounce of that damned dust of theirs. How they are fighting, or where we shall be when it's all over, I haven't any idea. But I feel it in my bones that the war is on. And Lawton, here, with all his highly trained and expensive scientists, can't tell us a single blessed thing about what's going on."

Before West or Green could reply, Gloomy Winters cut in.

"Senator Atkinson is right," he declared with gloomy emphasis as usual for him. "I've felt the same way for months myself. Well, unless the President has better luck in his new pool than we seem to be having here, we shall be cleaned out. I can almost see the debacle coming." He turned in considerable irritation on the inoffensive Lawton. "What's science good for, anyway, if it can't help us out of a mess like this?"

Lawton gasped. Then he had an inspiration. He saw the simple, obvious truth: "Why, to get us into a mess like this, I suppose."

"Trying to be funny?" Winters growled.

"Not at all. Isn't it pretty obvious that better scientists than ours somewhere across the water are responsible for all this?"

"So it is merely our misfortune, and nobody's fault in particular, to be scientifically and technically incompetent compared with our competitors?" Winters suggested. "Is that it?"

"Exactly!" Lawton agreed. "We do our best. It just happens to be not good enough."

Winters sighed. "Can't you dig up

something better than what you have—younger men?"

"We are combing the country, day and night, and have been for the past three years."

"But no luck?"

"None."

"Then we'll have to put our trust in—I don't know what. Anybody got anything else? Redding?"

"Nothing of importance. Just a suggestion for you to pass on to the proper department, and a historical item I thought might interest every one here. First, the suggestion. The secret service has simply got to plant a spy in their dust factories. Let them scrutinize every passport issued and try to find some prospective traveler with brains in his head. I agree with Atkinson that the war is on. My own figures alone almost prove it beyond argument.

"Second, the little bit of history." He held up a telegram. "This is from John Jarvis, of Jarvis & Sons, head of the oldest fertilizer-manufacturing concern in this country. Founded in 1776. For over half a century practically a monopoly. They have hung on, giving their stuff away, almost, ever since the dust came in. John Jarvis thought it might interest the national chamber of commerce to know that they closed up this morning at ten thirty. They are bankrupt."

"A shot near home," Winters remarked, pushing back his chair. "Gentlemen, we stand adjourned, to meet again on call from the President, should anything requiring our attention develop. Any one join me in a long mint julep?"

The vote was unanimous.

II.

JUST as Gloomy Winters stood up to lead his crowd into the bar, a young man some hundreds of miles away also stood up, rather nervously, not to walk out for a cool drink, but to receive the first substantial honor of his dawning career. John Jarvis, Jr.—"Jay," for short, to his friends—was about to receive his Ph. D. degree with the highest honors, and the coveted William Gibbs memorial prize, for an outstanding contribution to physical chemistry, at one swoop.

The prize—open to contestants from any part of the American continent and awarded on the recommendation of a thoroughly hard-boiled committee of the National Research Council—had been awarded to Jay for the "significant advance" made in his doctoral dissertation.

The dissertation filled exactly two pages in the journal which had accepted it for publication, and its unassuming title was "An Extension of the Periodic Law." The "Periodic Law" referred to was Mendeleeff's, of 1868, which brought order into the comparative chaos of the properties of the chemical elements, and which predicted new elements discovered later by chemists.

The "Extension" carried the law into the rich unexplored region between physics and chemistry which Mendeleeff would not have believed existed if he had been told and which modern explorations into the constitution of matter unexpectedly stumbled across.

Jay maintained—perhaps justly—that he also had merely stumbled. There was so much lying about loose between physics and chemistry, he said, that even the most cautious explorer must stumble over something of value sooner or later. Anyhow, this was Jay's alibi for running off with the prize. It consisted of one thousand dollars in cash and a gold medal.

But there was a string attached. Before the lucky winner could pocket the prize, he must explain, in three hundred words or less, to all who cared to listen, exactly what he had done to win the prize. Jay's ordeal had been set to

coincide with the award of his degree at the public commencement exercises.

As Jay faced the crowd and let the dean of the graduate school sling the doctor's gaudy hood over his head, he wondered what the devil he was going to say. In less than a minute he would have to speak his piece of three hundred words or less to an audience of about two thousand, most of whom confused chemistry with what goes on in the corner drug store, and physics with the stuff doctors used to make them take out of brown bottles.

His mind was a blank, so far as science might have occupied it. Jay was wondering what on earth was up at home. His father had been looking forward for a month to seeing the prize awarded and hearing the speech of acceptance—or explanation—and was to have arrived early that morning for the commencement exercises.

Just as Jay started for the hall, a messenger thrust a telegram into his hand. It was from his father.

> Sorry can't come. Important business conference. Congratulations! Good luck with your speech!

The fatal second had come. Jay found himself speaking in a clear, even voice. Before he realized that it was all over he had finished. To his amazement he noticed that the audience was roaring with laughter. Horrified, he tried to recall what he had said as he walked from the platform to his seat.

It all came back to him, and he sat down with a sigh of relief. He had simply reeled off the short mathematical formula which summed up his extension of the periodic law. The audience evidently had taken the performance as a joke. Even the dean was laughing. Jay had set a new fashion in speeches, ever short ones. His effort was probably the shortest formal public utterance in the history of America.

Freeing himself at last from crowds of well-wishers, including his friend and teacher, "Fatty" Perkins, Jay hurried back to his rooms, to find his exotic companion of three happy years, the dignified, reserved, but yet friendly little Count Tori, waiting in the study.

Tori had been sitting when Jay entered. He now rose slowly and came toward his friend, his face gravely sympathetic, and a folded newspaper in his left hand.

"It is best that I should tell you," he said, laying his right hand on Jay's shoulder and looking up steadily into his friend's eyes. He spoke precise, careful English, with only a trace of the distinctive accent that even the expatriates of his people never lose entirely.

"What is it?" Jay asked, his face going white. "From home?"

"Yes." Tori unfolded the paper. The banner headline told the rest: JARVIS FAILS. "I am sorry," Tori continued, "that my people have brought this on your old and honorable house."

Jay slumped into a chair. "I've been expecting it. Your people are not to blame. Business is business. This has been on the way for three years. I saw it coming when I started working for my degree. Now it has come. We hung on as long as we could."

TORI walked to the bay window and stood thoughtfully looking out, his slim, nervous hands clasped behind his back. Sensing at last that Jay had recovered from the stunning brutality of the first shock he turned slowly round.

"What will you do?"

"Go home as fast as I can, of course."

"Of course. And then?"

"I don't know."

"But there must be a brilliant scientific career for you," Tori suggested softly. "Your country is prosperous, and it can give you work to do."

"Perhaps. But I couldn't do it."

"Why not?"

"There is no disgrace in a failure like ours. But," Jay burst out savagely, "millions of people in this country will think there is. And I'll have to face the music and shout it down. No. The concert isn't worth the price of admission."

"You can't throw away a start like yours," Tori protested. "That would only give the slanderers something real to say."

"I've made no start worth considering. But for you I should never even have begun to start. What happened to-day was a farce."

"But for me?" Tori repeated in surprise. "What do you mean?"

"You know. If you hadn't held back your own work and given mine the right of way, I shouldn't have had a chance at the Gibbs prize. Your stuff is fundamental. Mine isn't. Why don't you publish what you've found?"

"Why should I? Do I have to make a reputation?"

"I suppose not," Jay admitted bitterly. "Your people look at that sort of thing differently from us. With us it is all personal ambition and a scramble for what isn't worth while having—as you realize when you get a jolt like this. You seem to care nothing for yourself. All you have goes for your people, whether your name is ever mentioned or not."

Tori interrupted him. "What you say about your work is not true. I speak now as a student of science, not as your friend. Your work is fundamental. Mine is trivial. That is why I have not published it. If my work was like yours, I should publish it—for the honor of my people, as you say. But it is not good."

Jay looked up, scanning Tori's expressionless face doubtfully. "You believe what you say. But that's just another proof that you belong to your people."

"How so?" Tori demanded, a puzzled look in his eyes.

"Your national inferiority complex."

Tori considered this explanation thoughtfully. The problem did not seem to concern him personally; it was either a scientific statement of fact or nonsense, and he was interested only in deciding which. At last he convinced himself that Jay was mistaken.

"My trouble," he said slowly, "has always been the exact opposite of my people's. I have been inclined to overestimate my scientific abilities."

"Well, as we can't seem to agree, let's skip it. While we are talking straight, I may as well go the limit and get something else off my chest. It has bothered me ever since I met you three years ago. We're not likely to see one another again after to-day, so I'll spill it now."

"It concerns me?"

"Both of us."

Tori's face betrayed nothing. If he had been expecting Jay's reckless revelation, he gave no sign but, like a seasoned poker player, kept his emotions to himself.

"It has to do with our world monopoly?" he suggested softly.

"You guessed it." Jay returned. "The very day the department of agriculture issued its first bulletin saying their experiments had checked the claims made by your agents for the new dust, I knew we were through. It could only be a matter of months, or at the most a few years, until our firm should be crowded to the wall with its hands in the air."

"Yes?" Tori encouraged gently when Jay hesitated.

"All right. I'll get it over. Do you know why I took up physical chemistry?"

"You started, if I remember correctly," Tori reminded him "in the chemistry of soils."

"That didn't last long. Old Hildebrandt here knows everything there is to be known of soil chemistry. He showed me through it all in six months. There was nothing to it. I'm not being high-hat about old Hildebrandt's stuff,"

Jay hurried on, noting the look of mild disapproval on Tori's impassive features. "Your people don't criticize their elders. Ours do. That's why we have gone ahead."

"Till recently," Tori reminded him.

"You win. Till recently. Anyhow, I thought I saw that old Hildebrandt's classic brand of chemistry couldn't get me very far on the road I was trying to take."

"So you built a new road?"

"More or less. You know where I was hoping to arrive."

Tori did not deny Jay's subtle accusation. Instead, he contented himself with a blunt summary of Jay's efforts.

"YOU HAVE not arrived," he said confidently. "The secret of our fertilizing dust is still as much of a secret to you as when you started."

"You have known all along what I was looking for?"

"Was it so hard to guess?"

"I suppose not, given my family history and the particular Cain your dust was raising with my prospects. You never said anything."

"Why should I have said anything?" Tori asked in mild surprise. "Industrial research is not the private possession of our great physicists and chemists."

"No," Jay agreed; "but you must have felt rather queer at times looking on while I—the only man here who would have anything to do with you—was trying my damnedest to scuttle your ship of state."

"I understood. You were within your rights. If you had not tried to work for your people, as our scientists work for them, I should have had a low opinion of you. Please let me finish. You do not admit it to yourself, but you are as jealous for your country's honor as I am for mine. Only you—like all your race—think it priggish to put your true motives into words, as we do. Personal ambition means nothing to you."

"That's where you're dead wrong. It means a lot. Do you suppose I like to see my father a bankrupt and myself kicked into the street just as I'm starting on my way?"

Tori dismissed Jay's self-analysis with a curt shake of the head. "As you said, let us skip it. We cannot agree. Do you know why I respect you?"

Jay laughed. "That's the sort of question no one of my race could ask to save his life."

Tori ignored Jay's acute discomfort. "I have respected you because you are the only man I have met in this great university who has not a trace of race prejudice."

"Not a bit. That's a fact. Black or white, red or yellow, they all look alike to me if they have brains. And some of your fellows seem to have considerably more than some of ours. Otherwise I shouldn't be in the jam I'm in now."

"You will get out."

"How? Tell me, and I'll do it."

"Join our research staff."

Jay stared at him in blank astonishment. "You mean that?"

"Yes. For two years I have followed your work. It is fundamental."

"But, hell, man! Don't you see what you are doing? You deliberately invite me aboard your ship to sink it?"

Tori smiled. "You will never see the engine room. As I have tried to make you realize, your work is fundamental. It touches the basic science from which the industrial advances of the next fifty years will spring. I am not asking you to join our commercial scientific division. You will be attached to the brigade of pure science, to work on your own problems in your own way. You may publish your researches when, where, and how you please, although we should be honored if you would use the 'Transactions of our Academy of Sciences.'"

"My hope would be," he continued seriously, "that the atmosphere of our research institutes would influence your pure science and color it to the peculiar genius of our people. But we shall make no effort to coerce you. I think we can promise you greater intellectual freedom than you could expect in this country.

"Remember, you are a very young man. If you start your career here, you will be dominated by the interests of older men till you are forty. Then your freshness will be stale, and you may delude yourself into believing that an administrative position is more honorable and more important for science itself than an inconspicuous part in the laboratory."

Tori elaborated his caustic prophecy with sarcastic accuracy. "Your name will appear frequently in the newspapers, and your fellow citizens will be told—and believe—that you are the leading scientist of the age. You will speak at banquets and before luncheon clubs. You will fall in love with your own pompous platitudes, and you will begin to believe them.

"When you are fifty, you will receive a prize and a gold medal for your great work in reconciling science and bigotry. And in the meantime the young men, whom you think you are directing, will be calling you a stuffed shirt and an old dug-out behind your back.

"You see," Tori smiled, "I have picked up your slang while observing the customs of your country. The young men will be right. Possibly—once in a while—the rich food at some tedious banquet will upset your digestion, and you will lie awake nearly all night. Then you will agree with your young men. Come with us, and you will have no sleepless nights."

"Let me think it over," Jay paced slowly back and forth, trying to foresee the possibilities. "As the girls are always saying, this is too sudden. I can't take it in."

"When will you decide?"

"Make it the day after to-morrow. I shall have to talk things over with my father first. You see, I can't very well run out on him at a time like this."

"I see." Tori nodded gravely. "But the business is bankrupt."

"That's the hell of it. I haven't an idea what has been saved from the wreck. If my people haven't private means enough to live on decently, it will be up to my brothers and me."

"You could send them part of your salary," Tori suggested. "We would pay you well."

"I suppose I could."

"When and where shall I see you?"

"The day after to-morrow? I would ask you to come and stay with us if things weren't in such a mess. As it is, I shall have to make it somewhere else. Suppose you meet me in the waiting room of the Union Station at Chicago, the day after to-morrow, at ten thirty in the morning. The fast train from here gets in then. We can go somewhere and talk it out. I'm taking the eight forty-five out this evening."

TORI AGREED. Wishing his friend good luck—or at least better luck—he left. Jay began the melancholy task of packing the photographs and few personal reminders of his three years as a graduate student that had been left out till the last moment.

He had barely finished and was just sitting down for a last smoke in the already dismal room when the bell rang. Opening the door, he was confronted by a ruddy-faced, jovial man of about fifty, expensively if somewhat loudly dressed in a flashy summer outfit. Jay sized his caller up as a liquor agent.

"Sorry," he said, before the man could introduce himself, "but I don't want any. I'm just leaving. Besides, I'm stony broke."

The other laughed a jolly, fat, friendly laugh. "Stony broke, eh? We can soon mend that, young man."

"Afraid not. I never buy anything on credit."

The supposed whisky drummer almost cracked his cheeks beaming. "You don't know just how good your credit is, young man. Try stretching it a bit. May I come in?"

Jay sighed. "All right. But I tell you I'm broke."

Having made himself comfortable in the overstuffed chair which neither Jay nor any of his friends ever thought of sitting in, the visitor expanded. He seemed to enjoy his own whimsical geniality.

"Well, well!" he beamed. "What a record, what a record! The highest honors—*summa cum laude*—and the great Gibbs prize for an outstanding scientific advance on top of it all. Boy, oh, boy, what a record! And only twenty-three years old. Think of it! If you're not all swelled up with pride like a poisoned pup, you should be. What are you going to do with it all?"

"Capitalize it and sell shares to the public at a nickel par. I'll make my fortune."

"Capitalize, eh? Capital, capital!" The jovial old scout chuckled excessively over Jay's somewhat rude retort. "You'll do just that very thing. Make your fortune. I should say so. And how do I know? You're asking me? Then I'll tell you."

He leaned forward and wagged an impressively fat and pink forefinger in Jay's face. "You are going to join our staff—the dandiest, keenest, upon-their-toes-est little bunch of scientific operators in the world. Oh, don't dream I'm going off half cocked. We know all about you—all about you. But you may want to go into details." He fumbled in his pocketbook and produced his card with an arch flourish. "There! You now know who I am."

Jay read the card without enthusiasm: "Justus A. Wharton. Personnel Officer. United States Bureau of Standards. Washington, D. C."

Wharton waited patiently for an outburst of involuntary enthusiasm, but none came. Somewhat sobered, he next produced a lengthy telegram which, rather guilelessly, he handed Jay to read. It was signed Lawton, and it instructed Wharton to get into touch with John Jarvis, Jr., immediately, to offer him rank and salary schedule A Q 14, and to instruct him, on acceptance, to report within forty-eight hours to Lawton at the bureau for instructions and work.

The telegram also gave full details of Jay's academic record, including the Gibbs prize and the title of his dissertation on the extension of the periodic law. Jay wished most heartily that he had never heard of that silly prize. Was it to stick to him like a blue ribbon on a prize pig at a county fair all his life?

One of Lawton's scouts, in their day-and-night job of combing the country for younger and fresher brains to staff the bureau, had blundered across Jay's record. He could hardly have missed it: even the New York papers had carried a short story of Jay's juvenile triumphs. Jay handed back the telegram without comment.

"Well?" Wharton asked. "What about it? It's a go?"

"What does A Q 14 mean?"

Wharton elaborated. A Q 14 was merely the code for an extremely flattering contract, to save the expense of telegraphing the lengthy terms every time Lawton thought they were demanded.

"I guessed that. What are the terms?"

I

WHARTON whispered them, with difficulty restraining his forefinger from poking Jay in the ribs during the conspiracy. Jay's face was impassive.

"Who would be my chief?" he asked

when Wharton had at last relieved himself of his burden.

"That's the best of it. Dr. Lawton himself." Wharton sat back to study the effect of his revelation. Observing none on Jay's face, he leaned forward confidentially. "While I'm not promising anything," he whispered, "I wouldn't say that it was wholly beyond the bounds of possibility that a brilliant young man with a record like yours might look forward to succeeding Dr. Lawton some day as director—say, when you are about forty."

"A stuffed shirt?" Jay murmured, more to himself than to Wharton.

"Eh? What's that?"

"I beg your pardon. I was just thinking." Jay stood up. "Glad to have met you, Mr. Wharton. Sorry I'm busy, but I've got to get ready for the train."

"You accept, then?" Wharton beamed, pumping Jay's hand.

"Sorry, but I'm not interested."

Wharton became quite severe in a friendly, fatherly fashion.

"You say no, but you mean yes. I know you boys. Boys will be boys—I've been one myself. Why, when I started at the bureau, I was just your age, and I thought it wasn't good enough for me. Do you get that? Not good enough for me."

Jay did not join in Wharton's hearty laugh at his own youthful folly and swelled head.

"I didn't realize then," Wharton continued confidentially, "that the humblest private in our ranks carries a field marshal's baton in his knapsack. Take a peek into that invisible bag I see strapped to your back, young man. Is it yes?"

"No. Please tell Dr. Lawton I'm grateful for his generous offer, but I can't accept."

"Why not? Isn't it good enough?"

"I'm simply not interested. That's all, and it's final. I may be only a young squirt, but I do know what interests me and what doesn't."

Wharton shook his head sadly. Like many men of his age, he could not realize that some young men of twenty-three are as mature as some men of fifty. That Jay was making a serious mistake was obvious to his myopic vision, and the supposed fact disturbed his really kindly soul profoundly.

He was disturbed also on another, strictly private, ground. A second telegram from Lawton had instructed him sharply not to bungle the job and to nail Jay before some commercial concern could grab him off.

"You will reconsider?" he pleaded.

"Afraid not."

"But there is a chance? Where can I get in touch with you after you leave here?"

"At home—Chicago. But I have made up my mind."

Wharton scanned the serious young face before him. "I believe you have. May I ask who our successful competitor is?"

"There isn't any. I'm going abroad for a long trip next week."

"I see. All work and no play makes Jay a dull boy. So that's it." He sighed his relief. "Lawton will be glad to know we haven't fallen down on our job. You'll have time to think it over when you come back from abroad?"

"Sure!" said Jay. "Glad to have met you. Good-by."

III.

JAY'S interview with his father in the main office was less painful than he had anticipated. Like Jay, the elder Jarvis had foreseen that nothing could avert the crash. Nevertheless, he had hung on till the last possible moment, paying cash as he went, till the resources of the firm were exhausted and the expenditure of another dollar would have been the beginning of debts that could never be discharged.

The vast factories now stood gaunt and idle, a total loss. But Jarvis owed

nobody a cent. The family could still hold its head up. A modest private fortune in his wife's name, carefully accumulated since the day of their marriage in anticipation of unforeseen emergencies, would provide for them in reasonable comfort.

The children were all well-educated—Jay was the last—and were able to stand on their own feet. The two daughters were married; the three sons could make their own way, with a little help if necessary.

Jay assured his father that he needed no help. If nothing better turned up in a day or two he could reconsider and take the job at the bureau. He had said nothing as yet to his father of Tori's offer. There was no point in kicking up the dust till he was ready to start on the road he was going to take.

The important conference which had prevented Jarvis from seeing his son graduate was a last session with representatives of his employees. Ever since the firm had started going downhill the employees had taken their share of the loss. To keep the business alive they had proposed cuts for themselves without a hint from Jarvis. Their last offer, to take a reduction had been refused. To have accepted would have meant going in debt to pay them anything.

"It was the hardest thing I ever had to do," Jarvis admitted. "I'm glad it's over."

"We may stage a comeback some day," Jay suggested hopefully. "Then we can take them on again."

"No chance, I fear," Jarvis replied with rueful conviction. "We're through. Fertilizers as we knew them will never come back."

"I hope not," Jay ejaculated with honest fervor. "The dust has no smell at all, good or bad. What I meant was this: Suppose some of our own fellows stumble onto the secret of making the dust. Then we can set up in business for ourselves."

"But you—and every other trained man I have consulted—say there is no chance of finding out how the stuff is made."

"Oh, I wouldn't be as pessimistic as that. Because we have failed for three years is no sign we shall for thirty, or even ten. Give us time."

"You have an idea?"

"Not exactly. Still, I think I'm on the right road to one."

"What has made you so hopeful all of a sudden?" his father asked doubtfully. "The last time we talked of this you were clear down in the dumps."

"I hadn't had a heart-to-heart talk with Count Tori then. You remember him, the slim little dark chap you met when you were East two years ago. Tori and I are bosom friends, as you might say. Really, I'm tremendously fond of him, and I think he has taken a shine to me. You see, I was the only man there who never noticed that he was a foreigner. I didn't have to be considerate; it simply never occurred to me that Tori was anything more or less than a fine fellow with real brains in his head.

"They gave me the icy for running around with him all the time. But I didn't give a damn. I was having too good a time. Tori has a mind like a dagger—goes through the ribs and gets at the heart of a difficulty. And on top of it all he is a swell guy.

"Just before I left to come home we had a solemn powwow. You would have cracked your jaw laughing to hear how solemn and sentimental we got. We gassed about our work like a couple of deans trying to line up some poor flat tire of a freshman with their mouths. Out of it all I got one priceless fact: I'm on the track of that dust."

"Did Tori tell you so?"

Jay laughed. "What do you suppose? If he had told me I was getting warm, I should have felt like jumping out of

the window. He told me? Not on your life! But he made what I consider a silly blunder for a man of his intelligence. I can explain it only by assuming that he knows less of our mentality than we know of theirs.

"He swore by all he holds sacred that I'm on the wrong track. Not just like that, of course, but he was very friendly and confident about it. He might have been telling a kid that he's got the wrong answer in arithmetic. There was no arguing about it. There it was, and that was that. I simply didn't know what the problem was all about and never would. By the way, you won't spill any of this? Even to mother?"

"Not if you don't want me to. But watch your step."

"I'll be careful. If I ever find out anything—ten years from now, or twenty—I'll keep it under my own hat till the plant is built and ready to operate. Then they can take their dust and——"

"That's not exactly what I meant," Jarvis explained. "In a game like this you must think of your personal safety."

"I have thought of it. And I shall continue to be the nice, impractical boy I am, dabbling away in pure science." Jay's jaw set. "Pure science? What the hell! When I have to depend for my bread and butter, my meat and potatoes, my oranges and grapefruit, on the good will of a bunch of foreigners nobody trusts, I'll let pure science ride for a while.

"They've only got to cut off the supply of dust for a year or two to have us at their mercy. They will wait till our standard of living has risen out of sight. How long would it take us to readjust ourselves to short rations and hard work while we were trying to find our way back to things as they were before this crazy prosperity swamped the country? Can you picture our doing it peacefully? On top of semistarvation we should have one first-class bloody revolution."

JARVIS sighed. "I was talking to Redding—secretary of commerce—the other day, and he made practically the same prediction. I don't like the way things are going a bit. All these maneuvers of the fleet and the army that the papers are full of don't help my peace of mind any. And if there is to be a row, I don't want to see you in it. You are too young to remember the last. The next will make that one look like a Sunday-school picnic. Keep out of it."

"Don't worry. I'm not rushing off to enlist."

"But you have some plan?"

"Only vague. I'll tell you if it comes to anything. Whatever happens, I intend to go on with the work I have started—for a time, at least. Tori's hint was too obvious to be passed up. And whatever happens, you needn't stew. I know enough to keep out of some kinds of messes."

"I shouldn't be surprise if you do." His father chuckled. "All you need is a little experience with girls to make you spyproof."

"How do you know I haven't had it?" Jay asked coolly. "We don't tell the old folks everything we know nowadays."

"As to that," Jarvis observed grimly, "you had better not tell your mother. She's still old-fashioned."

"We'll have to teach her to smoke," Jay suggested lightly. "That will break the ice. Many a good girl has gone to the devil because she smoked her first cigarette. If there hadn't been a first, there wouldn't have been a second, and so on, ad infinitum, Q. E. D."

"Get out of here before I throw you out!" his father roared.

"Just as you say. I'll not be home for dinner. Oh, by the way, before I go, do you still have that sample of the dust? I'd like to take it along, if you don't mind."

Jarvis handed over the small cylindrical box containing the sample. Jay

removed the cover and stood staring down at the smooth grayish powder. He tapped the side of the box lightly with his finger. A beautiful pattern of waves rippled over the surface of the dust. Had he not known that it was dust, and not a liquid, he might have mistaken it for dirty water.

"Pretty finely divided," he muttered to himself. "Wonder how they do it?" He abstractedly replaced the lid and slipped the box into a trouser pocket. "Well, I'll be seeing you. So long!"

"So long! Keep out of devilment if you can."

THE following morning Jay met Tori at the Union Station.

"Come on across the street. There's a quiet little joint where we can talk undisturbed and have a drink if we feel like it."

Tori tried to read from his friend's face what decision he had come to. Probably he succeeded. As they sat down at the farthest table in the deserted beer parlor, Tori remarked that he had bought two steamer tickets.

"Then we needn't take long to settle the rest."

Jay told Tori of the bureau's offer. Tori was faintly amused at Jay's description of the effusive Mr. Wharton.

"If you had accepted," he observed gravely, "you might have been Mr. Wharton's successor—twenty years hence."

"Yes; I thought of that."

"You have decided to join us?"

"I decided the moment Wharton left."

Tori fingered his glass of beer, which he had not touched with his lips, as he was a total abstainer.

"You are not avaricious," he remarked.

"How so?"

"Terms have not yet been mentioned."

"You said I would be free to work as I chose. Is that still good?"

"Of course!" Tori drew a cablegram from his pocket. "I shall translate." The salary offered by Tori's people was slightly more than four times Lawton's A Q 14. "If that is not enough, I believe I could get you more."

Jay waved the suggestion aside. "Too much. I'm not a hog, and I'm not worth a quarter of that."

"Your work will be worth many times what we can afford to pay you for it," Tori returned with a slight bow.

For a moment Jay was puzzled and slightly disturbed by Tori's grave formality. The man fingering the glass was not the graduate student he had known for three years at the university, but an older, graver man.

Jay laughed. "The farther you get from our old stamping ground the less Americanized you become. Three years of our great country seems to have made practically no impression on you."

"Practically none," Tori agreed. "I am already more than halfway home."

"Not going mystic on me, are you?"

Tori shook his head with a smile. For a moment he was once more the student Jay thought he had known. "No need to." Tori laughed. "Our boat sails five days from to-day."

"What?" Jay exclaimed. "That will give me only two days to pack and see to my passport. I doubt——"

"Your passport is ready. I attended to the formalities. Shall we go and get it?"

Jay rose in a daze. "How did you manage it?" he asked weakly. "It would have taken me days."

"Through the courtesy of your government. My rank, you know——" He did not finish.

"That explains it. Being a count has its advantages at times. Let's go and collect the passport. It will take some time for me to do my part. For one thing I'll have to be mugged."

"Mugged?" Tori repeated.

"Photographed."

"Oh, I saw to that. A suitable copy

Land-cruisers, with armor our shells can't even dent, that can ramble over rough country at eighty miles an hour, carrying six-inch guns!

was made from one you presented to me before your graduation."

"Well, I'll be damned! Come on, let's go. I must do my own packing, anyway."

THE PASSPORT safely tucked away in an inner pocket, Jay said he must hurry home. Would Tori care to come and meet Jay's father? Tori declined politely, saying he had business of his own. Jay did not doubt it. Before taking leave of Jay, Tori handed him a railway ticket.

"I shall be unable to take the same train as you," he explained. "But I shall meet you at the boat. In case of unavoidable accidents, I had perhaps better give you your steamer ticket, too."

Jay accepted it without a word.

"Good-by, till we meet again."

Tori lifted his hat and turned briskly away, leaving Jay in a daze. As he climbed into a cab he had a curious feeling that Tori must be about fifty years old. He had acted that age, anyway. That was the trouble with some of these foreigners; you could never size them up, or guess their ages, or find out anything worth knowing about how their minds worked. Jay came to the conclusion that he still had a lot to learn. Well, he would pick it up as fast as he could.

The resolve gave him an idea. Why not begin at once? He gave the driver a direction to one of the largest bookstores in the city. Before he was twenty-four hours older he would have mastered at least the alphabet—if it could be called that—of Tori's native tongue. Then he would go after the rest of it, tooth and toenail. The exercise might relieve the boredom of the long ocean voyage.

At home Jay's reception when he told his family what he had done was decidedly warm. At last his father got the rest of them cooled off a bit, and they set about the task of outfitting him like a gentleman in what little time remained before he must pull out. His two married sisters and both of his brothers were at home, all having thought it their part to rush to the support of the family when the disaster struck.

Jay didn't want to be outfitted like a gentleman. By a masterly stroke of strategy he succeeded in getting his mother and his brothers and sisters embroiled in such a terrific argument over the proper outfit for a young man going where he was going, that he managed to slip off to his room to make his own simple preparations undisturbed. But he was not to be left in peace for long. There was a rap at the door.

"Come in!" he shouted.

His father entered. "Telephone call. Whoever it is, says it's important."

"Oh, all right."

Jay dashed down to the second landing and picked up the receiver. "Jay Jarvis speaking. You called me?"

"I should like to see you at once concerning a grave irregularity in the matter of a passport issued to you. This is Arthur Adams speaking. You will find me at the Crane Hotel."

"Tori's gone and done it," Jay muttered, hanging up the receiver. "I thought it was all too smooth."

"Where are you off to now?" his mother called after him as he slammed the front door.

But Jay was already in a taxi before she could open the door to catch his reply.

"That boy will drive me crazy!" she said.

AT THE HOTEL Jay was sent up immediately to Adams' suite. He found himself confronting a tall, wiry man of about sixty with a parrotlike beak of a nose and a tousled mop of white hair.

"You're Jarvis?"

Jay nodded, and the other continued: "Then I guess you are the man we're after."

Jay's heart fluttered alarmingly. What had that fool Tori got him into? The next words confirmed his wild surmise that he had fallen foul of the Federal police.

"Let me introduce myself. My name isn't Adams. That's only to keep reporters away till we settle this—and after. I'm Senator Atkinson, chairman of the foreign-relations committee. Sit down and have a smoke. Care for a drink? I've been having one myself."

Jay accepted the highball and gulped down a good two thirds. "What's it all about?" he asked, as coolly as he could.

"That passport of yours."

"What's wrong with it?"

"Nothing. All perfectly regular."

"Then what——"

"I'm coming to it. We have your record from the day you entered prep school. Got it less than twenty-four hours ago. Then the committee thought I had better fly here for a personal interview. Let me put the meat of the matter first—we can tackle the dessert later. We want a man with some brains in his head to do a little harmless observing over where you are going. All he will be asked to do is to keep his eyes open and report what he sees to us."

"Who are 'us'?"

"Me, first. Through me, the President's cabinet. I can prove that." The senator produced a short note confirming what he had said. "Recognize the signature? The stationery is O. K., too?"

"It looks genuine, but I'm no expert."

"You'll do," the senator remarked approvingly. "Now, without swearing you to secrecy, or anything like that, I'm going to tell you a story and trust to your good sense to keep it to yourself. Not even your father or mother is to know. You can judge for yourself whether the main points are true."

The senator then proceeded to give an exact, detailed account of the conference which had taken place on the day of Jay's graduation. Even the telegram which Jarvis, Sr. had sent Secretary Redding, announcing the bankruptcy of the Jarvis firm, was included. Redding's suggestion that all passports be scrutinized had brought results sooner than they had dared hope.

In a caustic aside, Atkinson congratulated Jay for having turned down Lawton's generous offer of an assistantship to himself. Jay, he concluded, was just the observer they were looking for—young, alert, scientifically trained to notice what the ordinary highly trained observer would overlook completely; and last: the son of an old family that had been driven to the wall by our professed friends but prospective enemies. They could not have found a more suitable observer for the particular job in hand if they had ordered him made to specifications.

"That's the meat of it. Now for the dessert. The department concerned will pay you the top salary permitted by their scale for as long as you can contrive to stay on the job, with a substantial bonus for any information of particular value—say a hint as to what that new metal or alloy is they are using on their tanks. General Green is worried about it, and I don't blame him. If you find out how they make that infernal dust of theirs, Congress will vote you anything you want within reason."

"What if I get caught?"

"We'll get you out somehow."

"With the navy?" Jay suggested innocently.

The senator saw the point. After what he had told Jay of Admiral West's perplexities there was not much to be said in rebuttal of Jay's skepticism.

"But you have brains enough not to get yourself into any crude jam our diplomatic corps can't talk you out of. You won't go taking photographs of

forts and factories, or anything of that sort?"

"Hardly," Jay admitted. "Still, I haven't agreed to accept."

"You will, though?"

"Sorry, but it can't be done."

"Why not?" Atkinson demanded, his beak growing sharper.

"Because I'm already signed up."

"Signed up? Now?"

Jay told the senator what had passed between Tori and himself that morning. When he finished Atkinson was speechless for a moment.

"You did that all by yourself? At your tender age? I guess you don't need a nurse or instructions from the likes of me."

"I did only what I was forced into doing."

"Who forced you? Tori?"

Jay made a wry face. "I'm beginning to suspect he did."

"But why? What's his object?"

"That's what I'd mortgage two years' pay—right now to know."

Atkinson considered the problem in silence. Privately, he half feared he was about to see the last of Jay. Tori, from Jay's account, did not impress the senator as the sort of friend one would pick as a guide to living in a secretly hostile country.

"Watch your friend," he advised.

"Tori? Oh, he's all right."

"Mightn't it be safer to resign now and pay him a visit later with competent agents of our own hovering in the background while you went sight-seeing?"

"I would rather go about what I hope to do in my own way."

"Well, perhaps you are right. Going? But I suppose you are pretty busy. Have another drink?"

"No thanks."

"Then I'll drink to your success. Good luck!"

IV.

LEANING back comfortably in his Pullman seat, Jay sighed luxuriously. He had the car practically to himself, two old ladies at the farther end being his only fellow passengers.

"Phew! I'm glad that's over."

He was referring to the leave-takings, mostly solemn, partly tearful, with his anxious family. Exerting his youthful obstinacy he had firmly forbidden any of his family to come to the station to see him off. But it had been bad enough as it was.

He could not repress a delighted grin as he thought of his last act before boarding the train. He had tipped a special messenger a dollar to hurry out to the house with a farewell present for his mother—a sort of surprise package. Jay could almost see his mother's face when she opened the package—a carton of one hundred gold-tipped Turkish cigarettes and a long ivory-and-lapis-lazuli holder.

On a card inclosed with the gift he had written brief instructions: "Take two after meals and cheer up. Dr. Jay Jarvis." If his mother flung them into the wastebasket or pitched them out of the window, Jay felt confident that his sisters would salvage the wreckage. So his money had not been entirely wasted.

He opened his hand bag and extracted the formidable grammar of Tori's language which he had purchased. In ten minutes he was lost to the world, struggling desperately with the illogical intricacies of a bafflingly idiomatic speech. Why the devil, he wondered, couldn't these people say outright what they meant, instead of dressing everything up in metaphors that conveyed the opposite of what was intended?

Early the next morning the train cut across a corner of one of the great corn States, and Jay had an opportunity to observe the effect of the dust in large-scale farming. As he sat out on the

observation platform taking in the tossing green that flowed rapidly back toward the horizon on high sides of the track, he felt strangely oppressed.

Never before in the history of the world had there been a furious abundance like this. If the train were to stop suddenly, he imagined, he would hear the steady, rustling growth of the dark green masses as the voracious roots sucked the last drop of nutritive moisture from a deep black soil that was unnaturally rich. And yet, a short time before, this terrifying jungle of unripened food had not been even imagined.

The soil from which it sprang, in what seemed like an unwholesome, specious parody of abundant health, had been exhausted and barren for fifty years. The clamor of a foreign market, demanding food and yet more food, had brought the sterile stretch back into cultivation, and one application of the dust had made it as fertile and as prolific as a plague feeding upon its own offals.

Something that bluff, salty old Professor Hildebrandt had let slip in an unguarded moment came back to Jay's memory with sinister force. Old Hildebrandt was habitually such a rosy-souled optimist that any unconscious lapse into pessimism on his innocent part was remembered by his students long after they had forgotten all the cheerful things he tried to instill into them about soil chemistry and its manifold blessings for a hungry mankind. Jay recalled one such memorable slip as he tried to take in the meaning of the rank, oppressive abundance stifling the plain.

"We humans," old Hildebrandt had remarked, "are a queer lot. Keep us just a little hungrier than is quite comfortable, and we have a gut to raise hogs and corn enough to glut us all. Then, when we've got too much, we bust our remaining gut to breed ourselves into semistarvation again. It is what is called the fundamental law of bioeconics, gentlemen.

"Malthus may be out of date, but we continue to feed and breed. The human race can breed itself hungry in two generations, even when completely smothered in food at the start of the race. If you will pardon a very bad pun, gentlemen, I sometimes picture the human race as a breeding contest. The fastest breeders win the race and carry it on beyond the winning post—starvation for half the winners. But let us get back to our soils and manures."

As Jay recalled his teacher's theory he remembered also the jubilant vital statistics of the Great Recovery. Twenty months after the first dusting the birth rate had skyrocketed. But even the enormous crop of new babies could not cope with the oceans of cow's milk inundating the lowlands, and most of it was evaporated and condensed for export to the sellers of the dust.

What they did with it all nobody seemed to know, as their birth rate, always high enough, it is true, had barely risen at all. Possibly they were prudently hoarding against the happy day when they could overrun their neighbors' more spacious territories, to provide more than standing room only for the full crop of babies which their industrious race was undoubtedly capable of producing at a few months' notice.

Jay was joined by a swarthy, stoutish man smoking a fat cigar the color of an unhealthy pickle. The newcomer was the sort that longs to confide in any hapless fellow passenger he can catch where jumping off is dangerous if not impossible. Jay liked him at the first glance and accepted the proffered cigar—mate to the pickle.

"I'm in ladies' underwear. What's your line?"

"Elements."

"What's that? I don't get it."

"Iron, copper, tin, aluminum, and such stuff."

"I get you. Working for the metal-trades combine?"

"More or less. Exporting just now."

The underwear specialist was impressed. "Say," he burst out, producing a telegram, "what do you say to that?"

In silent wonder Jay tried to grasp the cabalistic message. Was is cipher? For a moment he thought Senator Atkinson was trying to communicate with him in this roundabout, deadly mysterious way. "JAKE TRIPLETS RACHEL." What on earth could it mean? He handed back the message silently.

"Pretty good, eh?" the specialist challenged.

"I should say so," Jay admitted doubtfully.

"Rachel's pretty good, I admit, but I didn't think she had this in her. Last time it was only twins."

Jay kept a straight face. "After all it isn't so remarkable in times like these. It's just part of the general prosperity."

The specialist sucked at his cigar and let his eyes rove over the terrific green surge of unrestrained fecundity billowing up all about them. A bland content smoothed the rounded contours of his swarthy face, and he sighed with his whole stomach.

"Yes, I guess that's it," he agreed. "Prosperity has come to stay." To his simple eyes it was all as shiningly clear as the summer sun blazing down on the steaming crops.

THEY SAT smoking in silence for nearly an hour, till the green nightmare ended abruptly, and the train glided out onto a level expanse of barren brown gravelly soil stretching to the horizon.

"They're dusting this, too," the specialist observed, pointing to five specks against the blank blue sky. "See how straight the planes fly. I'll bet those fellows keep the same distance apart for hundreds of miles."

"If they keep it up," Jay remarked, "they'll soon have corn enough to feed all the hogs on Mars."

"I shouldn't wonder," the specialist concurred absently.

In a few seconds he was fast asleep, and Jay sat staring idly. The motion of the train rocked him into a delightful trance between sleep and waking, in which he neither thought nor dreamed. His mind was busily at work, but he was totally unaware of what was going on inside his head.

As has often been noticed by brain workers, some of our best thinking is done for us. The soil must be prepared before the seed can sprout; but, given the right conditions, the seed will germinate and take root of itself. Jay's mind had been prepared—although he did not know it at the time—by his work on an extension of the periodic law. It now needed only a chance gust to waft some vagrant seed in the right direction to start the mysterious thing we call life or, in Jay's case, creative thought. His head nodded, and he dozed.

A curiously jumbled conversation, in which Rachel and Jake, triplets and rank green corn by the thousand square miles, Tori and Atkinson, dust and battleships, Lawton and the personnel officer Wharton, all seeming to join in and express their weirdly distorted opinions of Jay's work on the periodic law, flouted through his head. Under it all the *clickety-click, clickety-click*, of steel on steel as the wheels hit the welded junctures of the rails, hammered out an absurdly logical refrain: "My name—is Jake; my name—is Jake; I sowed—the seed; I sowed—the seed."

By this time Jay was more than half awake. He woke fully, with a jolt, clearly conscious that his absurd conversations about triplets with the expensive Jake had indeed sowed the seed of a brilliant idea in the well-prepared soil of his mind. Why on earth had he not thought of it before? It seemed the most natural thing in the world to try.

Without disturbing the sleeping Jake, Jay got up and made his way to the writing desk in the club car. He reached for a telegram blank and hesitated. There was a lot to be said in his message, and he wondered whether the air mail would be fast enough to deliver his letter and a reply, addressed in care of the steamship company, before his boat sailed. Deciding that this was no time to save a few of his thousand dollars, he wrote out his message and addressed it to Senator Atkinson, Washington, D. C. Then he glanced at his watch and consulted the time-table. They were due at the next station in eight minutes. Not trusting the drowsy porter to hand in the message to the station operator, Jay walked out onto the platform and waited.

Most of the message was taken up in an urgent appeal to Atkinson to induce the proper authorities to devise some safe method of getting reports to him during his stay abroad. Jay had no idea who the proper authorities might be, but he felt reasonably confident that the senator would. Nor had he any suggestions as to a method of safe communication. In his message he stated that, in his opinion, his correspondence would be thoroughly scrutinized by experts who would leave no trace of their tamperings.

The rest of the message suggested that Senator Atkinson consult Lawton immediately and learn the names of the best men in the country to carry out certain experiments which Jay himself was not trained or competent to do. Having found these men, Atkinson—again through the "proper authorities," but a different set, naturally—was to prevail upon them to start the experiments going at once.

As soon as they got any definite results, they were to let the senator know, and he was to see that the results were promptly and accurately transmitted to Jay. As the results in question would all be mere numbers, and certainly less than two thousand, they could easily be fitted into a code—provided some safe way of using a code could be devised.

The experiments which Jay suggested were entirely out of his line, but would be mere routine to a good biologist with an up-to-date training. Jay simply wanted to know what effect, if any, the dust had on fruit flies. If it did affect them, did it make them more or less prolific? In either case, were the offspring sports, or deformed, or were they normal? If the flies were affected, was it possible to screen off the effect of the dust? And, if so, what were the wave-length numbers, on his own—Jay's—periodic scale, corresponding to the screens?

The train stopped, and Jay hurried to the telegraph office. On the way back he saw Jake stretching his legs. Jake hailed him.

"Business rushing?"

"I'll say! Just sent off a rush order I forgot."

"That's bad. Once got myself fired for a mistake like that." Jake interrupted his reminiscences abruptly. "*Oi, oi!*" he croaked. "I forgot to wire Rachel the names." In a waddling run he made for the telegraph office as fast as his fat legs could take him.

"Better hurry," Jay called after him. "We've got only two minutes left. How about Shadrach, Meshach, and Abednego, if they're all boys?"

But Jake did not hear him. The porter shoved the exhausted father aboard just as the train began to gather speed, and that was the last Jay saw of him. Jake's sprint had upset his digestion, and he spent the rest of the journey in his parlor compartment.

Jay passed the time fairly painlessly over his grammar. He planned to surprise Tori by greeting him at the pier in his own language and hoped his self-instructed pronunciation would not turn

a neat compliment into an obscene jest or a deadly insult. It was a tricky language.

ARRIVED at his destination, Jay went directly to the pier. There was no sign of Tori. Jay tried the information desk. The clerk, a compatriot of Tori's, assured Jay that Tori would arrive in time. He then handed Jay a bulky telegram. Retiring to a secluded corner before opening it, Jay tore the envelope. As he did so he glanced back over his shoulder involuntarily. The clerk was watching him like a lynx.

"If there's any answer I shan't send it off here," he muttered. He thrust the message into his trouser pocket and strode into the street. It was still nearly an hour to boat time. Jay stepped into a cab. "Take me to the farthest telegraph office you can make and get back in time for the boat. Say fifty minutes for the whole trip."

As Jay had anticipated, the bulky message was from Senator Atkinson. Its contents were somewhat of a surprise. Jay gathered that he was not the only one trying to find out something about the dust. Atkinson first reported that he had consulted Lawton and others as to the three best men for the experiments proposed by Jay. The experts were unanimous in naming Davisson, MacMillan, and Spier. These names, the senator added, meant nothing to him, but Lawton had told him that Jay would have heard of the men. Jay had.

What followed was the unexpected item. These three biological experts had been carrying out experiments with the dust of the sort Jay wanted tried for the past nineteen months. They had reached certain conclusions, but did not care to give out anything until some of the crucial details could be checked by an exhaustive set of control experiments. These were now in progress and would be finished in about two weeks.

The results so far were startling, but they could not be considered conclusive. It would not be possible at the present time to furnish Jay with the numbers on his own scale for which he asked, but they hoped to secure what he wanted when the control experiments were completed.

Atkinson then went into the matter of communicating with Jay at considerable length. Through Admiral West, he had got in touch with the code department of the navy, and through them with the international secret service—foreign-service spy system. All of these experts agreed that it would be extremely difficult, if not impossible, to communicate with Jay, where he was likely to be working, in any spyproof way.

For the present they had no suggestions, but had set their best men on the problem. Should they reach a workable solution Jay would first hear of it when he received a message from them which he would recognize. If they succeeded in getting this through, they could then devise a means whereby Jay could send out messages. In the meantime he was to count on nothing and to take no unnecessary risks.

The cab drew up at a telegraph office.

"Will this do? The next one is about eight minutes farther on. We can just make it and get back in time."

"This is O. K. I want to sit a few minutes. Give me five minutes' notice before we must start back."

To the costly tune of a busily ticking meter, Jay sat and considered his problem, trying desperately to get a grip on it. How could Davisson, MacMillan, and Spier communicate with him, and how could he get word back to them or to Senator Atkinson should it be necessary?

He thought so hard that his mind became a blank. Vague, inconsequential snatches of conversations drifted through his inattentive memory, and disjointed fragments of unrelated scenes passed unnoticed before his eyes.

Gradually most of these faded into the background, and Tori dominated the dreamlike stage.

What was it that Tori had said about Jay's work? It was "fundamental." No; that wasn't what he wanted; it was something else. Unaware that he had done so, Jay let his head fall back on the cushions and closed his eyes.

Tori's image and his voice came up sharply clear. Jay could hear everything now, and he saw Tori as clearly as he had seen him that last afternoon in his rooms. What was he saying? This was it; he must get this.

"You may publish your researches when, where, and how you please, although we should be honored if you would use the 'Transactions of our Academy of Sciences.'

"Eureka!" Jay shouted, startling the driver, just as the latter was about to tell him he had only five minutes more to sit. "Wait for me."

He dashed into the office and grabbed a pad. Then he did the fastest job of writing he had ever done. The clerk was just beginning to count up the words when the taxi driver stuck his head in at the door.

"All right?" Jay nodded. "I'm coming." He slammed down two twenty-dollar bills. "If it's more than that they will pay at the other end." He followed the nervous driver and hopped into the cab. "Step on it. I can't afford to miss that boat."

JAY'S scheme was so simple that he wondered at his own slowness for not having thought of it at once. What he wanted from the biologists was a mere number, certainly less than two thousand, of a screen or filter, as measured on his own scale, if the biologists discovered that a screen would cut off the effect—if any—of the dust on the fruit flies.

As Atkinson had hinted pretty plainly, it would be difficult if not impossible to get any secret communication to Jay, and if the desired information was not conveyed in absolute secrecy, "the enemy" would know at once that Jay was spying.

Jay's scheme was spyproof. The biologists were to publish the results of their experiments in the biological journal which they used habitually and which made its way regularly once a month into every scientific library and biological laboratory in the world.

But to publish the truth in a form that any expert would recognize immediately, while not throwing suspicion on Jay, perhaps, would be a blunder of another kind, and quite as bad a one. For it would tell the enemy that American scientists were at least stumbling about in the immediate neighborhood of their secret. Then Jay would be strictly watched as a mere matter of elementary common sense.

To get around this, Jay proposed that the biologists substitute "gamma rays," or "electrons" for "dust" in their published reports. The wave lengths, or intensities, or both, of these were to be recorded in the customary international units. In the first tabulated list of measurements, the eleventh, twelfth, eighteenth, and twentieth, were to be doctored; the last digit in each of these measurements was to be one of the numbers in the screen number which Jay wanted on his own scale.

For example, if the biologists found that the effect of the dust was "screened" at 1452 on Jay's scale, the eleventh number on their fake list of measurements was to end in 1, the twelfth in 4, the eighteenth in 5, and the twentieth in 2. If no screening effect was detected, then the designated measurements were all to end in zero, so that "0000" would spell "no effect."

The faked measurements were to be concocted so as to seem entirely plausible to a casual inspection. There was already a vast literature of such experi-

ments and tabulated measurements, and one set more was not likely to excite either suspicion or curiosity.

Only when some Ph. D. candidate began checking the work would its scientifically worthless character be exposed. The worst that could happen would be a sudden drop in the scientific stock of Messrs. Davisson, MacMillan, and Spier, but they would have to stand the loss for the good of their fellow citizens.

To make it plain that they were indeed communicating with Jay, the biologists were to "sign" their communications by the number 7938. The digits 7, 9, 3, 8 were to be the next to the last in the eleventh, twelfth, eighteenth, and twentieth of the recorded measurements.

As for Jay's end of it, he would use the "Transactions of the Academy of Sciences," as Tori himself had suggested. He intended to continue work on his revision of the periodic law. His figures would be published in terms of his own scale. If he succeeded in finding out what was the active principle in the dust, he would publish the digits giving its scale number as the fifth, seventh, ninth, and thirteenth digits in his second table, but with this difference—the indicated digits of the scale number must be divided, beginning with the first, by 5, 8, 8, 6 respectively, and only the remainder of these divisions were to be kept.

Thus, if the number furnished by the direct reading of the four indicated terminal digits was 6886, the correct number would be 1010; 2978 would correspond 2172, and so on. To prevent wild-goose chases, Jay was to indicate when he was transmitting the required scale number by "signing off" with zero as the terminal digit of the second, fourth, tenth, and fifteenth numbers in his second table.

As the "Transactions" were received regularly once a month by every scientific library in the world, there was no danger that Jay's communication would be overlooked. After that it would be up to the men in the physical and chemical laboratories to do the rest. With a hint like the one Jay hoped to broadcast, they would deserve to be wiped out if they failed to duplicate the dust in any desired quantity.

The driver got Jay back to the pier four minutes ahead of time. He need not have hurried. The boat was held twenty minutes for Count Tori, whose plane had been delayed by adverse winds.

To be continued.

A sudden spasm of unreasoning hatred swept me. He was trying to keep me from going back!

Stars

by David R. Daniels

A story of two men who dared the skyways.

THE SHIP gleamed all silvery except at the rocket vents where it was burned black. From the outside one could not tell how wrecked it had been or how difficult it had been to repair. Or having seen the wreckage, a mechanic would not have thought it would be so difficult. It would not have been—on Earth. But here the soft, humid air seemed permeated with a languor which made it hard to work, which made one not want to do anything except merely eat and exist. That was why it had taken so long.

Twilight was falling when Erikson finished. The sun was seldom visible in the cloud-obscured sky, and he was surprised to find it was so late. All day he had been working, and since he could see an end to his labors he had never noticed when the light began to fade. Now his job was finished.

Erikson came out of the ship and looked around. Thank Heaven, after another day of this drab scenery he and Oliver would be away. The ship would fly again and carry them up and out of the cloud envelope and into clear space. He had tried not to think of these things since empty longing is so hard, but now he could afford himself the dissipation. It was good to think of space again.

Erikson stood so still that a wuz-wuz almost blundered into him as it hopped out to explore the gathering night. There was a heavy piece of iron in the man's hand, and he hurled it at the furry, rabbitlike creature, catching it just back of its short ears. It fell over and was struggling spasmodically as he seized it. Death came so easily to Venusian creatures. Venus, Goddess of Love, she had been called on Earth, and so it seemed here. In the six months he and Oliver had been on the planet they had caused more bloodshed than the natives would have in years. Yet both had attempted to be careful when they saw how the Venusians lived.

It was very queer. Now that he had killed the animal he would be forced to prepare it, and perhaps eat it. Oliver seemed to be growing so like the Venusians. And they would look at him with distaste amounting almost to horror reflected in their soft eyes. But they would never say anything about it. When he had finished his repast they would accept him as they had before. It was as though any action would be too much trouble. He knew that they did not fear him, that they did not even know what fear was; but on the other hand, they were all sunk in apathy, and he and Oliver were growing the same way. It was Venus!

Erikson was still thinking about that when he glanced up at the sky. But he forgot it in an instant, for he saw a star. In the six months since the flyer had landed upon the planet he had seen no more stars than he could count upon the fingers of one hand. He stood gazing up at it, the creature dangling limply from his hand, his yellow beard barely rippling in the ghost of a breeze.

It was a great green planet. Erikson fancied he could see a smaller point of yellow light beside it. He stood and looked, and he felt all thoughts seep out of him and longing surge in to fill the void. That was Earth up there, and she was calling him.

A LIGHT hand touched one shoulder and brought him around quivering. A soft-eyed Venusian was standing by him, very humanlike in the dusk. The creature was gazing at him as though it wondered somewhere within its body what this man was thinking about but found it too much trouble to ever really think of such things.

"What do you want" Erikson asked. Then when the Venusian just stood he remembered and translated the question. The queer words were still hard for him to pronounce, though the tongue itself was a simple one.

Oliver wanted him to come, the Venusian said. Irresolutely Erikson turned away from the star. In a moment it would be swallowed up by hungry clouds and he might never see it again. If he stayed here much longer he wouldn't care, he wouldn't care about anything he was thinking as he made his way down the hill to where the tribe was gathering together for the night. Away in the dusk the forests of zir-vers were hulking black and languorous as everything else. When he looked back and upward neither the ship nor the star was visible.

He drew a little apart from the others, and after starting a fire he sat on his heels and began cutting up the wuz-wuz. He heard Oliver approach, but he did not look up.

"What kept you so long?"

Erikson was deep in thought again and the question had to be repeated. "I was hurrying to finish the work," he said at last. "Oliver, we're through. We'll spend to-morrow figuring our course. Earth and Venus are nearly at opposition now and less than forty million miles apart. We'll start in the evening. Oliver, I saw Earth a little while ago."

The other merely grunted, though Erikson did not notice. He was thinking of the long trip back through the void. The two had finished the wuz-wuz before either spoke again.

"Do you think we ought to go?" It was Oliver who broke the silence.

Erikson looked up quickly. It surprised him to find that his companion did not share his eagerness. "What do you mean?"

"Just that. Don't you think we owe it to the Venusians to stay here and help them? When the ship crashed we would both surely have died if they hadn't taken us in. Well, we owe them something for that, don't we? We know a lot more than they do, and we could stay here and teach them."

Erikson laughed, a short hard laugh. "Teach them what?" he demanded. "What good can we do them? They're happy—happier than the people of Earth will ever be—for they've never taken the trouble to find out there are unpleasant things. As for teaching them—what have we done in the last six months?"

Oliver started to speak, but the other interrupted rudely. "You're getting to be just like they are, Oliver; you don't want to go home. Have you been chewing lotus blossoms or something? Say, are you afraid?"

There was a hesitation before the reply came. "Maybe so. How much fluid is there in the tanks?"

"Don't say tanks; say tank. About half of one."

"So little? I'd forgotten." He forced himself to do some mental calculations. It seemed like a great effort to turn his mind to the problem, though he was able to think clearly once he had started. "That's barely enough to get away from Venus," he said at length. "In fact you'll be lucky to do that. Then what will happen?"

"Why then we'll just coast. We'll head off in the right direction and drift. By the time we reach the Moon's orbit some one should notice us and pick us up." Strangely, Erikson had not given that part of the matter much thought.

"Should, but will they? Erikson, you know as well as I do that the thing you contemplate is nothing more than a glorious way of committing suicide. If we stay here we'll be alive; before long a ship will come for us. It's about time we were discovered."

Again Erikson laughed. "Nobody will ever look for us; nobody knows where we are. When we started you insisted upon keeping this trip secret so that we could get all the glory. If it were ever noticed that we'd gone, no one thought we'd come here, since Venus was so far away then. Well, we had the glory, now we can find our way back home again. Don't you want to go?"

"I'm satisfied here," was Oliver's vague reply. "No, I don't believe I do want to go," he added after a time. "Like you said, the Venusians are happier than man will ever be, and I've fallen into their way of thinking and looking at things. Why do you want to go when you know that at best you've got about one chance in a million of ever making it successfully?"

Now it was Erikson's turn to pause. "It's hard to explain. Just longing, I guess. For a while I was like you are now, but after seeing that star to-night, I want to go. I'm going!"

Oliver looked at the brawny form. It came to him that with different apparel, a horn headdress, and a sword, Erikson would look like his ancestors had a thousand years ago, now that his beard was long.

"Sort of a twenty-first-century trip to the far islands? It's in your blood, I guess; I'm glad it's not in mine." There was irony in the words. "Behind me there's no old urge for the dragon ships and the unknown waters of the West. Best forget it, old man. About all you'll do is die. Now as I said——"

"Damn whatever you said! Listen, Oliver, to-morrow I'm going, and you'd best go along. But whether I start alone or not, I'm going. Now let's sleep."

One could see by Oliver's eyes that he was still thinking as Erikson got up and strode off to find a place for the night. Yet in a few moments he apparently gave up the effort, for he, too arose and sought a place near his companion.

The Venusians were also retiring. They slept on the ground wherever they chose. There were no carnivorous animals on Venus; the nights were tropical, and except for occasional gusts of warm rain there was nothing to cause discomfort even to the two Earthmen. All in all it was a most peaceful world.

ERIKSON wondered why he also did not choose to stay here. If he once let the apathy overcome him, let himself drift into the life as Oliver had done, might he too wish to stay?

Most probably he would drift out of thinking, out of dreaming; and in twenty or fifty or a hundred years another ship would drop out of the heavens and its occupants would wonder from whence had come the human bones. His work was all that had saved him.

And he would forget the stars!

That thought brought him up, sitting. Heritage, wanderlust, whatever it was, something in him struggled against the thought.

Oliver had been awakened by his companion's movement and he called out petulantly to find out what was the matter.

"Nothing," Erikson answered. "I was just thinking."

"Then stop it and go back to sleep."

Erikson did as he was bid.

He drifted into slumber to awake suddenly. Something was wrong, he knew. He looked over at the place where Oliver should be, but he was gone. His sleep-drugged mind was slow to respond, and it was a minute before he realized that something in his brain was calling him to wakefulness.

Where could Oliver be? This brought him wide awake, for there was but one place he could have gone. He rose quickly to his feet, his great muscles obeying his will even more lithely than they would have on Earth. Oliver must be at the ship, tampering with it so that it could not fly, draining out the rocket fluid, probably. So that was his idea—he was unwilling to take the trip back to Earth, so he would fix things so Erikson could not go.

Erikson could imagine him lying there in the dark, his brain gradually goaded into coherent reasoning. Then he had made his plan and stolen off into the darkness.

Well, Erikson would see. He found a short piece of wood, and the thews of his forearm writhed hard as his fingers closed about it. Oliver was a traitor, and there was but one way to deal with traitors.

Even now there was but half a tank of rocket fluid, barely enough to carry the ship away from Venus' attraction.

Erikson felt anger pounding through his body and making his temples hot.

He picked his way carefully among the sleeping Venusians. They lay singly or in groups, something pathetic about their brown bodies and their soft daintiness—they were so carefree. Erikson, even in the midst of his anger, felt again the half wish to let himself sink down to their level, to forget everything but just plain existence. Here in the lazy, warm air of Venus it would be so easy to do.

He made his way quickly up the slope, the club still in his hand, though the fierceness of his anger was ebbing. As yet he had heard no sound from the ship. Probably Oliver's idea was to open the tank so that it would leak its precious fluid slowly, then he would creep back and pretend to be sleeping. The fuel would ooze out, ignite, and ooze again. In all likelihood the tank would finally catch and blow one side out of the whole ship. In any case the sally would put a stop to any question of flight, were it successful, since there was no way of obtaining more rocket fuel.

Erikson could see the top of the ship now. He went more carefully, stooping over as he gradually topped the rise. He stopped behind one of the low bushes which on the morrow would open its chiming blossoms, but which was now asleep. The club was still grasped in his hand.

Moving in front of the ship was a dark blot which he knew was Oliver. Had he already done his work and was he now coming back? No, he moved toward the ship. Erikson must have wakened just after he had left, and knowing more surely the way to the ship had made better time.

He crouched. Oliver was nearly to the flyer now, but the distance was short, and the other had never been swift of foot. The silveriness of the ship showed plainly, and subconsciously Erikson wondered at it. He had been thinking of Oliver so hard that he had not noticed how strange it was that he was able to see anything at all. Nights on Venus were usually impenetrable blobs, since the clouds obscured all starlight, and the planet had no moons. But this night things showed plainly.

But still Erikson did not really notice. He gathered his feet under him and charged quickly. The other was caught unprepared, and he froze into immobility as a Venusian might have done under the same circumstances. A Venusian! Even while he charged Erikson noted the similarity. He remembered how peaceful the sleeping creatures had looked. However, a traitor must pay!

In a moment he had reached Oliver and caught him by the shoulder. Still the man stood as though he did not comprehend his companion's rage. Erikson's club swung up.

"I'm going to kill you," he said savagely. "Lord knows you deserve it."

Yet he wasn't sure, since the other did not act at all like the man he had been. His new self wasn't responsible. As Erikson spoke he gazed skyward as though for verification. Then he saw that the clouds had parted and that the stars were shining through. Not a lone star, but constellations of them, as clearly as they might have been seen from Earth. There was some seasonal change at hand and for a moment there were no clouds over this portion of the planet. But it wouldn't do any Earthly astronomer any good, since he would never be able to tell it in the night.

ALL thoughts went out of him leaving that void feeling of longing. He had thought that nothing could turn his rage aside, but now it was gone as though it never had existed. The poignant longing was for the moment everything that had ever been.

"Look up, Oliver," he commanded.

The other obeyed. For a full minute his face was turned skyward, and it shone full of surprise, but that was all. Something had seeped out of the man as Erikson's rage had seeped out of him, and he was now only a shell of what he had been. And the knowledge made Erikson ache all the more, so that he could have killed the other if it had not been for the memory of the sleeping Venusians. He felt himself trembling all over, though he could not have told why.

"The stars have come out," Oliver said at last. "They're pretty, aren't they? But so cold and so far away." His face turned away from them.

"When you see them," Erikson asked in a low voice, "doesn't it make you want to go?"

"No? No, it's dark and cold out there. I like it much better here. This is a nice place. Don't you think so?" He put one hand on Erikson's arm, and suddenly the man realized that the other was very sincere. He had not thought so before. In some ways that made him angry, and sorry, and it made the poignancy of his longing worse. A moment before he would have hated Oliver for that speech, but now he felt that he could never hate again. Something had gone out of him also since he had been on Venus, but he had never felt it until this moment.

"Listen," he said roughly, fearing that if he spoke otherwise he might see too clearly how Oliver felt and become like him. "Listen. I'm not going to kill you as I had intended at first, but on the other hand, I can't leave you here to wreck the ship. So I'm going; I'm going now, back to—to the stars, do you hear? Don't try to stop me."

Oliver nodded. "Yes, but I think it is a very foolish thing to do."

"Then you don't want to go along?"

The other shook his head vigorously. "Of course not. I'd rather you didn't." His voice was pleading. "You'll die; you know it."

Erikson flung him aside roughly. "You're dead right now," he said, for he was still afraid that if he let himself go he would become like the other and never feel longing again.

Oliver sat on the ground where his companion had pushed him. He saw Erikson climb into the ship, saw the tight space door bang and lock behind him. Still he sat there, wondering idly if the other really meant what he had said.

A thought came to him to rise and run to the ship, to pound on the door. Erikson was leaving, and Oliver didn't want to be left alone. But when he remembered that his friend was going out into dark space he changed his mind. No, Erikson was very foolish, as he would soon find, to his dismay. And Venus was a nice place, Erikson or no Erikson.

A rumble was beginning, and the silvery shape quivered. The rumble gathered into a roar; the ship left the ground to hover for a moment low in the air. Then it shot away, the flame of its passing obscuring the stars.

As he watched it grow smaller Oliver felt cheated. There would now be no man to talk English to when Venusian grew tiresome. All in all it was very unkind of Erikson to treat the two of them thus.

He tilted back his head and watched the ellipsoid growing smaller as it climbed very high.

Erikson riding the sky again realized that the thing he longed for was not to return to Earth, but to go back to the sky, to fly swiftly among the stars. And he had never realized that they were so bright, so close, so poignantly alluring.

It was good to be back among the stars!

An Episode in Space

by Stanton A. Coblentz

We were none too happy as they approached!

IN THE COURSE of our explorations beyond the borders of the Solar System in the rocket car *Mercury*, my three companions and I came across a planet which we christened Orcus, because it reminded us of that cheerless realm which the Romans ascribed to the disembodied dead. This planet, which was of about the size of our own world, was dull-red in com-

plexion, and was illuminated by a faint ruddy sun which, glowing like an expiring ember, was so dim as scarcely to be visible at the distance of the Earth, although it is one of our nearest neighbors in space.

Upon approaching Orcus, whose great round disk had something of the appearance of dried and clotted blood, we hesitated to risk a landing, for it struck us as not only uninviting but sinister. And sinister it turned out to be—sinister beyond our gloomiest anticipations! But, at the same time, it turned out to be more interesting than anything else we had observed in the heavens: it confronted us like a vast portent, a prophecy of the condition of our own world in some remote future a thousand million years removed.

We accomplished the landing with comparative ease, since Orcus has an atmosphere a little less heavy than that of Earth, and, therefore, the birdlike wings of our car were able to find ample support as we glided slowly downward after turning off the great hydrogen propellers. But chemical tests of the atmosphere, while we descended, were bitterly disappointing; the air, we found, was peculiarly deficient in oxygen, of which it contained scarcely one per cent by volume—so that a being reared on Earth would gasp vainly for breath and perish in a few minutes.

If we wished to step abroad on this planet, accordingly, there was no choice but to adjust our oxygen tubes and tanks, whose supply we could renew by distilling the scanty oxygen of Orcus' atmosphere.

As we sank slowly downward in a dense, red twilight, while a spectral, crimsoned sun gazed immensely overhead and irregular sandstone-colored hills and plains stretched endlessly beneath, a superstitious fear arose in even the most firm-hearted of us and we began to wish we had not selected Orcus as a landing place.

I recall how big Jim Sully, first mate of the *Mercury* and my chief engineer, hoarsely whispered, "By Heaven! There's no good coming to us here! Can't you see? It's a planet of the dead!"

"Yes, it's one great blank cemetery!" chimed in Steve Winters, our pilot. "If there was ever anything living down here, it died a million years ago!"

"A million! Most likely a hundred million!" contributed Ramsay McGough, who, as our chemical and geological specialist, was entitled to be heard. "Judging from the looks of things, it may have been even longer than that since there was oxygen enough to support life as we know it."

And, as he spoke, he pointed through the heavy quartz observation windows to those vacant red landscapes, which, unredeemed by any sign of a river, lake, forest or human habitation, struck us as an unrelieved and unending desert.

This impression was only confirmed when we had come to a landing in a deep rocky valley surrounded by long jagged ridges with an oppressively weird and desolate appearance. After we had adjusted our breathing apparatus and stepped out of the car, we found ourselves in a vermilion-tinged atmosphere like that of late sunset, with a wilderness of crags, boulders and riven ledges strewn about us like the wreckage of some battlefield of Titans.

Fortunately, we were able to move about with a good deal of celerity, since the density of Orcus, being somewhat less than that of Earth, provided less gravitational resistance; besides, the cold was by no means as severe as we had expected—the thermometer stood at several degrees above freezing point. These facts compensated us to some extent for the difficult and obstructing nature of our surroundings. But nothing could reconcile us to that unchanging reddish light, nor to the haunting sense

of something ghostly, undefinable, terrible in these alien plains and peaks.

As sober-minded men of science, however, we tried our best to put aside such obsessions; tried to forget the mysteries and perils everywhere surrounding us; tried not to remember our appalling isolation as strangers from a remote planet, alighting millions of miles from all other creatures of our race.

Though a persistent dread could not be shaken from our deeper consciousness, we strove hard to assume an attitude of cheer; and, following our prearranged plans, set about to make scientific observations and discoveries to report to our fellows on Earth.

AS NOTHING of particular interest, other than broken reddish rocks, was to be observed in the neighborhood of the *Mercury*, it was decided that two of us, equipped with radio and heavily armed, were to set off on a short exploring expedition while the others remained behind to guard the car.

Lots were accordingly drawn, as was our custom in such cases, and the lucky chance designated Jim Sully and me.

With every sign of elation although not without secret misgivings, we started out together on that excursion which was to prove stranger, more interesting and more harrowing than the most morbid-minded of us could have foreseen.

Taking care to register the way we went by chalk marks on the rocks, we proceeded for several hundred yards through a tortuous defile between torn and tumbled boulders; then found ourselves in an irregular, flat, open space where we stopped short with surprised exclamations, delighted at a curious discovery.

Upon the ground, sparsely scattered like sagebrush clumps in an American desert, were innumerable clusters of a cactuslike plant! Not over six inches high, and with spike-shaped yellowish-red leaves as thick as a man's finger, this vegetation gave every sign of that hardihood necessary for life on a perishing planet.

It was with great difficulty that Sully and I succeeded in breaking the stems, which were penetrated by fibers of a hempen toughness; however, the inside was soft and succulent, and exuded a thick purplish juice; which was sweet and not unpleasant to the taste. Evidently Orcus was not wholly dead, for the roots of the plants, piercing to some substratum of the soil, had been able to obtain that scanty minimum of water necessary for life.

More than half an hour was consumed in observing this plant, which we called the "ink weed," because of the color of its juice. By the time we had completed our inspection and had cut off a few specimens to take away with us, we made another discovery, though of a very different nature.

Repeatedly we had glanced up at the dull, reddish sun that hung overhead, half unconsciously expecting it to descend, as was the way of the Sun on Earth. But as the minutes went by and no change in its position became noticeable, both Sully and I were forced to the inevitable conclusion: the day of Orcus was as long as its year! The planet always kept the same face toward its sun, as the Moon does toward the Earth, and as our own Mercury does toward its parent orb!

This it was that explained the relative warmth of Orcus's surface and the survival of plant life; for the solar radiance was so weak that the temperature would have been far below zero had the sun not shone incessantly. On the opposite side of the world, the cold must be unimaginably severe!

As Sully and I rambled on our way, we speculated as to the possibility of animal life, of which thus far we had not seen any sign. To me it appeared

likely that no crawling, flying, or four-footed thing had ever dwelt on these desolate plains. Yet I was not certain, for the red coloration of the rocks was not exclusively due to the crimson light, but, on close scrutiny, proved to be the product of ferrous oxides, which showed that the amount of free oxygen in the atmosphere had probably once been far greater than at present, but had been absorbed by the rocks—so that animal life might formerly have been possible.

But I did not have to rely upon theoretical arguments. My companion and I had hardly passed beyond the borders of the ink weed, when Sully stopped short with a stare of amazement, and pointed to a yellowish-white object half hidden amid a mass of rocks. It was long and pointed, and so desiccated that it crumbled at a touch; but its nature, as we gradually unearthed it, could admit of no doubt. It was the bone—apparently the thigh bone of some ancient monster! Half as thick as a man's body and between three and four yards in length, it showed that Orcus had once boasted a dinosaurian population!

I must admit that I shuddered just a little as I observed this grisly specimen. If dinosaurs had once prowled on these plains, I asked myself, who knew but that some of them still survived? And as this question flashed into my mind, I had that vague subconscious feeling, which serves many of us like a sixth sense, that something was moving behind me; and, at the same time, wheeling about, I observed a most astonishing, most incredible object.

Or, rather, I observed it only in part; I merely caught sight of the slinking hind parts as some dark-reddish creature glided among the rocks a hundred yards away, and out of sight. What was it? Unfortunately, I could not say. I only had the impression of something crouching, dark-colored, and swift of movement; something that sent an uncanny feeling shuddering to the very pit of my stomach.

Sully, who had wheeled about simultaneously, had also caught a glimpse of the creature, and apparently he too was puzzled. After staring for a few seconds in the direction in which it had vanished, he motioned to me and we set out together in pursuit—though little did either of us surmise the remarkable adventure into which we were plunging pell-mell.

WHEN we had reached the point at which the creature had disappeared, we were startled to see a sort of crude tunnel channeled out of the rock; a downward-sloping gallery which, with walls five or six feet apart, led toward the obscure depths. At first it did not strike either of us that this was other than the handiwork of nature; it had probably been hewn out, we thought, by some long-vanished watercourse, though to-day it served as the lair of desert beasts. And, with this belief in mind, we advanced cautiously into the gallery. How were we to know that we were walking into a trap?

Only a few yards from the opening, we distinguished a rectangular marking in the wall, of about the size and shape of a small door, and so regular in its outlines that we could hardly believe it to be of natural origin. As we stood observing it in startled wonder, the two of us spontaneously put out our hands to examine it more closely—and thereby we completed the process which chance and our own folly had begun.

No sooner had my fingers touched the wall than I had the impression of coming into contact with something compressible and yet resistant, like a steel spring; I heard a sudden peculiar sound, halfway between a thud and a muffled clanging; and instantly we were plunged into such a whirl of events that, to this day, my mind has difficulty in

forming an impression of all that happened.

I only know that, on a sudden, everything seemed to give way all about us. The floor beneath our feet subsided; the wall in front of us collapsed; we found ourselves slipping, tumbling, sliding down into emptiness, scrambling on all fours as we strove vainly to save ourselves. There came a rattling to our rear, as of heavy partitions clattering into place; there came a sudden sense of weight, an oppression in our heads; then our eyes were confronted with strange lights, and a dizzy pale-green illumination suffused us weirdly as we struggled to our feet, and, bewildered, took note of our new surroundings.

So rapidly had everything occurred that at first we did not realize the obvious: that one of us had unwittingly touched a hidden spring in the wall; that a trapdoor, on which we unconsciously stood, had been released, and that we had been precipitated into an underground compartment——

Fortunately, neither of us were hurt. And well indeed that we were not! We were to need every ounce of our energies! As we regained our feet, we saw that we had entered a great subterranean hall, illuminated here and there with sun-shaped pale-green orbs. Though scarcely as high as an average room, this gallery was scores of yards across, and apparently hundreds of yards long, and was filled with an intricacy of strange objects that relieved us once and for all of the idea that Orcus was not inhabited.

As we stood gaping about us in wide-eyed unbelief, we recognized that it was not only peopled, but was peopled by beings of a high order of scientific ingenuity! How otherwise explain the myriad machines that rolled and rumbled about us? The great dynamolike devices? The wheels that slowly rotated? The intricacy of coils and wires? The vials and glass tubes in which water bubbled and dark-brown and greenish liquids seethed?

Bewildering as were all these sights, we made another discovery that surprised us equally. In the course of our pell-mell descent, my breathing apparatus had become dislocated; and when, to my horror, I observed this fact and made the first frantic effort to readjust it, I suddenly noted that I had been breathing without it! The atmosphere of the cavern contained oxygen enough to support life!

AFTER I had had time to adjust myself to this knowledge, I turned to Sully with an inviting smile. "Come on in!" I exclaimed. "The air's fine!"

With a grimace, he removed his own breathing tubes; then, drawing a long, deep breath, turned to me, and muttered:

"By gosh, Chris! Smells like ozone! The real article!"

"The real article!" I echoed. And then, glancing uneasily about me at those uncanny greenish lights and at the strange mass of machinery, "But what sort of devils' cave are we in, Jim? Don't you think we'd better get out?"

Sully peered behind him at a closed door, which gave the only evidence of the way we had entered; then, with a defiant grin, drew an automatic revolver from his belt, and flung out:

"What's your hurry, Chris? We'll get out in good time, but now that I'm down here I want to see what the *whole* infernal mess is about! Who's going to hurt a couple of able-bodied, well-armed men like you and me? Not afraid, are you?"

"Of course not!" I denied, seeing the sneer on Sully's determined face. Nevertheless, I could not suppress a deep persistent warning voice; and it was without enthusiasm that, taking out my own revolver, I trailed after my friend

as he cautiously advanced down the aisle among the machines.

"Say, old bird, now I can begin to see what this is all about!" he ruminated, as he paused before a water-filled glass container, penetrated by wires, and pierced at each side by a glass tube, into which streams of bubbles were rushing. "I take it all back, what I said about Orcus being a planet of the dead. It's a damned live planet, after all! A damned civilized one, too!"

"That doesn't mean the climate is healthy," I objected, still not able to overcome the persistent, gnawing sense of danger.

But, disregarding my sally, he went on, enthusiastically, like one taking pride in his own acumen:

"Now here's how I make things out, Chris. The Orconians—who are probably a decent lot, after all—used to live up on the surface of their planet. But that was in the good old days, a few million years ago. Gradually, as the oxidation of the iron-bearing rocks exhausted the oxygen of the atmosphere, it became difficult, and finally impossible, to breathe up above. But the change was so slow the people had time to prepare. So they scooped out these galleries down here, and established all manner of apparatus to release oxygen by electrolysis from the rocks and water. Why, that's all clear as day! You see this big, wired glass vat—I'm a bubbling idiot if the water isn't being dissociated by electrical means, releasing the oxygen through one tube and the hydrogen through the other! In galleries like these, cut off from the upper air, science might be able to produce oxygen enough for a limited population, even though a man couldn't support himself one minute in the open!"

Coming to a halt, Sully puffed his capacious chest approvingly, as if to say, "Am I not a smart boy for guessing all this?"

"Well, that does sound reasonable," I admitted, begrudgingly.

But at the same time—though I am not ordinarily one to tremble at shadows—that deep warning sense within me grew more urgent, more imperative, as if to command, "Fly, fly, before it's too late!"

"If what you say be true," I argued, making a motion to retreat in defiance of the self-willed Sully, "then do you suppose the natives will be pleased to find us down here, helping ourselves without even a 'Thank you!' to their hard-earned oxygen? Don't you think they'll look on us as just a low order of air thieves?"

"Well, no, to tell the truth, I hadn't thought of it that way," my companion admitted, as, unperturbed, he passed on to examine a beautifully moving little shuttle device a few feet down the gallery. "Say, from the engineering point of view, I'll tell you——"

But what he was going to tell me I never learned. For he stopped short in mid-sentence, uttered a low exclamation, and stood staring ahead of him as if petrified. And I, electrified by his alarm, also stood stock-still, speechlessly staring. Oh, how I wished that he had heeded my warning in time! For what we saw was fit to inspire no confidence in the boldest.

From behind one of the giant machines, not fifty yards away, half a dozen curious-looking beings had emerged. Stooping like apes, and with long, pointed ratlike heads, bulging chests, and slender two-legged bodies seven or eight feet high, they seemed a cross between man and beast; yet they were clearly human, as was shown by the brightness of their jetlike eyes and the sagacity of their wrinkled gray countenances, which gaped wide at the sight of us, revealing toothless gums behind huge slits of mouths.

Most of them were clad in some dark, close-clinging material, a little like the

hides of animals; but one, apparently their leader, wore a scintillant, light-reflecting covering that glittered oddly in the greenish-yellow illumination, making him look like some magnificent, sinister prince of demons.

AS EVIDENCE that the encounter was a surprise to them no less than to us, I noticed that several of them had been sucking at some spike-shaped yellowish-red objects, which I recognized as leaves of the ink weed, and which, evidently, they had been able to obtain while venturing into the open with the aid of breathing devices. But, at sight of us, they dropped these objects to the floor, in consternation like that of beings faced with a hostile war party.

Their eyes stared wide, with a terrifying increase of brilliance; low sounds like snarls came from between their lips, and several of them stepped back in fright; while the foremost drew themselves erect to their full eight feet and stood confronting us gigantically, in a silent menace that made the hair bristle on our scalps.

Several seconds passed without a word—seconds as tense, as harrowing as any through which I have ever lived. Then, of one accord, Sully and I started to back away. On my companion's face, ordinarily suggestive of an unbounded daring, I could see the contortions worked by fear; I could note a quivering in the gnarled features, and observe how his very knees were trembling beneath him. Neither of us knew quite what it was that made the strangers seem so peculiarly menacing; perhaps it was only their repulsive appearance, with the rodent heads and the sly, brilliant eyes; or perhaps some telepathic sense had warned us of their hostile intentions.

That they recognized us as beings from another world is improbable; it is more than likely that they looked upon us as alien and degenerate intruders of their own species. For their attitude was much as our own would be if we should discover some unknown savages invading our cities, helping themselves to our bread, and—for all we knew—endangering the lives of our children.

Suddenly, the Orconian leader—he of the strange glittering costume—stepped forward aggressively, beat his long bony left hand gorilla-fashion against his bulging chest, and uttered a low rumbling howl of menace. Then, with his right hand pointed accusingly in our direction, he emitted a sharp, shrill cry as of mingled condemnation and command; and in that vivid fraction of an instant, while his scintillant form twisted uncannily, with snaky reflections of the greenish-yellow light, I recalled my prediction that the natives would resent our consumption of their oxygen.

Now I do not believe that either Sully or I are cowards; but when we heard that challenging cry, and when, the next instant, the leader and his followers wheeled about and started toward us at a determined stride, we lost the last remaining shreds of our nerve, and, before we were quite aware what we were doing, had whirled around and raced away.

But to no avail! We were soon to learn how hopelessly we were trapped! From our rear came a peculiar hooting sound, like mocking laughter, when, after a few seconds, we found ourselves face to face with a blank wall. The doorway of escape was firmly locked!

Somehow, while my mind worked with the speed of terror, I grasped the facts. The trapdoor which had admitted us was designed so that the natives might enter as quickly as possible, so reducing the loss of air to a minimum. But somewhere there must be another spring which, if pressed, would shoot us back outdoors!

Yet, in vain I searched for such a

spring. And meanwhile, the natives, whose numbers had multiplied, were gradually drawing nearer, the brilliant light in the wrinkled, ratlike faces boding no good as they stared at us with a fixed fascination.

"Think I'd better fire?" whispered Sully, who had lifted his revolver and aimed. "I'd like to blow the devils to smithereens!"

"Just a minute!" I warned, catching at his arm in apprehension. "We can't wipe out the whole lot of them! We'd be overwhelmed and killed!"

"At least, we'd die fighting!" swore Sully, who again raised his revolver, while one finger reached longingly toward the trigger.

The Orcovians had now completely circled us, and the nearest of them, but a dozen yards away, were staring at us with hideous grimaces, as of savages who had corralled the foe and were planning grim vengeance.

At the same time, as if to heighten our apprehension, several of them had drawn long saber blades, and were waving them high in the air like signals. In another moment, we would be butchered!

Sully and I both grasped our revolvers more firmly than ever.

"Don't shoot to kill!" I warned, convinced that no hope lay in this direction. "Merely frighten the demons off!"

More closely yet, more closely and more menacingly, waved the long blades. Excited rumblings burst from the throats of our nearest foes; the multitude behind them jabbered confusedly; a bloodthirsty greed seemed to fill all eyes. And then, all at once, like a thunder blast, came the banging of Sully's revolver.

FROM THAT MOMENT, events moved with terrorizing rapidity. There rose a sudden, heart-rending scream, and the Orcovian leader, his scintillant splendor stained with gushing red, clutched at his heart, toppled, and sank groaning to the floor. And almost at the same instant, a howl of dismay, of consternation, of fury, broke from the throats of the mob. There was a wild rush, a vengeful roar, and scores of natives were dashing toward us, with sabers upraised, and angry hands outthrust to rend us limb from limb!

Then how our revolvers crackled! Though several of our assailants fell, others were rushing up to take their places from behind. We could see the glaring eyes, the faces contorted with rage, the stooped forms lunging forward as if shot out of a catapult. Within another moment, we knew, our ammunition would be exhausted, and then—before we could reload——

But at that instant the longed-for stroke of fortune occurred. One of our bullets, aimed wildly in our haste, shattered its way into a glass vat, bubbling and seething with chemicals—and that was the last I was to know clearly for a time. There came a tremendous eruption of smoke and flame; a dull explosive roar was in my ears; I felt myself whirled around and violently flung to the floor; I groaned as a multitude of pattering objects fell upon me in a sudden rain. Then I lay dazed and helpless, before, painfully striving to rise, I discovered what had happened——

The interval, though it seemed exceedingly prolonged, could not have been more than three or four seconds—otherwise, I should not have survived. My most pronounced sensation, as I strove to rise to my feet, was one of gasping, of panting for breath; and though I still did not quite realize my predicament, I reached impulsively for my breathing tubes, and, with a dexterous jerk, fastened the apparatus into place. Then, as the life-giving oxygen penetrated to my lungs, the fumes cleared from my head; and shaking an accumulation of debris from me with a

hasty toss, I somewhat unsteadily resumed a standing position, to be confronted with the tottering Sully, who, with his breathing tubes newly clapped into place, had been unconsciously duplicating my own maneuvers.

Now what a strange scene we both beheld! The picture of it all, unearthly, spectral, and ghastly beyond all words, has come back many a time to haunt me in nightmares! First of all—and most shocking to the senses—there was the change in the light: the greenish illumination had vanished—replaced by a sepulchral reddish radiance! Through an opening just overhead, we caught glimpses of a huge ruddy sun! The roof, shattered by the explosion of chemicals, showed a great jagged fissure, through which the devitalized outer air was flowing in! This it was which explained my gasping sensation!

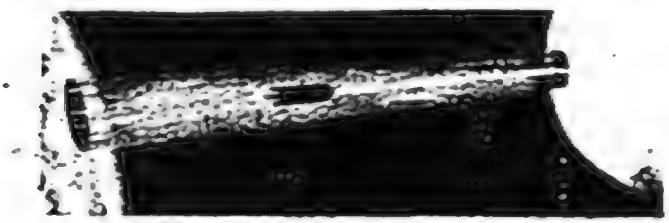
And this it was, also, that accounted for a stranger fact. Scattered before us on the gallery floor, contorted in grotesque attitudes, our former foes were writhing in their last agonies. They twisted and squirmed like snakes! Piteously, they gasped, with faces turned a sickly purplish blue! Their wide-open imploring mouths, distended like those of fish out of water, gaped as if in last frantic prayers to some unresponsive power! Unlike us, the Orcomians had not had any breathing apparatus at hand when the collapsing roof had let out the oxygen——

In a minute, the hopeless struggle was over. The natives tossed and groaned for the last time; a horrible death mutter rattled in their throats; then, with a few final convulsive jerks, they turned over and lay still.

Even before they had breathed their last, Sully and I were making good our escape. To scramble out through the shattered roof was by no means easy; but by virtue of Herculean efforts, by climbing over heaps and rocks and masses of shattered machinery, we accomplished the perilous ascent. Then, standing on the weed-strewn desert in the weird red light of their unmoving sun, we glanced once more into that pit where scores of Orcomians lay sprawled in death. Just how many had perished we did not know; nor were we ever to learn whether the outer atmosphere, penetrating into the remotest fissures of their home, had not ferreted out and suffocated every surviving member of the race.

It was with a feeling of deep melancholy—the melancholy of men who have looked upon the death of a world—that we made our way back to the space car *Mercury*.

Half an hour later we were again on our way through immensity; for we had seen enough of Orcus, and silently prayed that fate might never again take us to a world so forlorn, so desolate, and so dismally prophetic of the remote future of our own planet.



When the last ship had settled on the bottom of the crater, they emerged—the Earth's first colonists—to conquer the pock-marked surface of the Moon.

EARTH'S

A story in which is revealed age-less life, infinite wisdom, and, in the end infinite sacrifice.

MAUSOLEUM

A novel which gives new meaning to the world's long-dead parasite.

by JOHN RUSSELL FEARN

NORTON VANE, assistant chief astronomer of the Vernwich Observatory of California, was singularly puzzled—indeed, more puzzled than he had ever been in his life before.

For quite twenty minutes he had been peering into the eyepiece of the new and stupendous lunar-refractor with which the observatory was equipped, and the longer he looked the more astonished he became. Then, presently, he disengaged his eye from the lens, blinked a trifle in the normal electric light, and resorted to considerable stroking of his chin.

"Astounding!" he commented at last, addressing the mute scientific instruments grouped about him. "The thing is unprecedented. I must find the doctor——"

With quick strides he left the immense observatory, passing through the connecting doorway into the research department. Here he found Dr. Hugo Konsicks, the presiding genius of the observatory, lately promoted to his high position by the American Institute of Science.

"Doctor! Doctor! The most amazing thing has happened!" Vane shouted. "You must come right away!"

Konsicks looked up from the astronomical charts he was studying. His mild blue eyes, behind thick-lensed spectacles, surveyed the excited young astronomer with all the calm maturity of late middle age.

"What's the trouble, Norton?" he inquired, good-humoredly. "Has the Moon turned blue, or something? You seem pretty upset!"

"I am—and I have reason to be! The rays of Tycho, Copernicus, Kepler and Aristarchus have entirely disappeared! For the first time in the Moon's history!"

"What!" the doctor cried, leaping to his feet. "But—but that's impossible, boy! They're inseparable from the lunar surface——"

"No use in arguing, sir—they've gone," Vane returned tensely. "Even the smaller telescope we possess reveal that fact; with the giant telescope it's possible to see something peculiar existing in Tycho crater. A sort of chasm. Come and look."

"Assuredly I will! Most remarkable!" The astronomer put his charts to one side and followed the younger man back to the lunar-refractor. Excitedly he took off his spectacles, then jammed his gaze to the eyepiece.

The view, to him, immediately became that of a portion of the Moon's brilliant surface, rendered viewable by semismoked glasses—the immense crater of Tycho filling all the view. Normally, it would have been a vision of blaring, reflected Sunlight, with the strange phenomenon known as "bright streaks and rays" fully in evidence. But to-night, for the first time in history, the rays were absent! Nor, as the refractor was moved to cover other portions of the Moon's surface, were there any streaks from the other salient "radiation" points—Copernicus, Kepler and Aristarchus.

"You're right, Norton—the rays are missing!" Konsicks breathed. "And there is something else. Chasm of some sort—— By jove, yes—clean down the center of the crater floor!"

He withdrew his eyes and looked at Vane in dazed astonishment. In the same silence of profound puzzlement he replaced his spectacles, then, as though with a mute union of thought he and the young man moved to the balcony of the observatory into the open air, gazing with their unaided eyes at the full Moon, sailing high in the Californian night sky. Yet there was no apparent change. Truly the markings were more distinct owing to the removal of the bright streaks, but otherwise nothing was altered.

"What do you make of it, sir?" Vane asked at last, staring steadily upward.

"What am I to make of it?" Konsicks demanded almost impatiently. "You know as well as I do that those mysterious rays have been a feature of the Moon's face ever since man first looked at the heavens. Only at full Moon, as it is now, are these rays seen with any degree of clearness—one band extends, as you know, for seventeen hundred miles. Nothing has ever satisfactorily explained them—never explained how it is they pass through solid mountains; pass through everything and maintain a perfectly straight course. And cast no shadows!"

"Some experts say lava, doctor," the young man reminded him.

"Lava nothing!" The doctor's disgust was clearly manifest. "A stream of lava spreads out as it goes. It would form a lake on meeting a valley. These rays pass straight on over valley and hill alike, never once deflected. Nor can they be attributed to direct instead of oblique light, because at the edges of the Moon's apparent disk, on which the solar rays fall obliquely at full Moon, the brilliancy of the rays is the same." Konsicks paused and smiled faintly. "Funny to be reciting all this stuff, and now the rays have gone!" he muttered. "There's something unparallel, something entirely strange and unsuspected, happening way up there, Norton. Come on—let's get back to the refractor."

THE TWO returned to the observatory and the doctor resumed his observations of the satellite. Vane, chafing with impatience at being shut out, had to be content to listen to his superior's comments—breathless comments, stabbed out at intervals.

"Norton, there is something stirring in the depths of that chasm on Tycho's floor—I'm sure of it! In fact—— Good heavens! Something is rising up, resembling a submarine, as near as anything I can think of. Gleaming in the Sun——" Konsicks stopped and stared with all the intensity at his command, jealous of the faintest trace of mist on the lens, occasioned by his hard breathing.

The immense power of the instrument, the most powerful in the world, was capable of quite distinctly revealing any object above two feet in size on the lunar surface, so it was small wonder that Konsicks gazed dumfounded at what he beheld. It went against all his scientific training and reasoning powers.

For a machine, of sorts, was indeed rising out of the chasm on the crater floor, until finally, after seeming to hover for a space, it came to rest on the floor itself. There was a long interval, and Konsicks waited patiently. Subconsciously he noticed that the rays of the Sun were now streaming down into the chasm itself; he decided it was curious he had not noticed it before. Had the Sun somehow brought this machine to life? Had the chasm been created on purpose? Certainly it had not existed hitherto.

"What's going on, sir?" It was Vane's voice, tense with excitement. "Tell me!"

A long pause followed, then Konsicks answered the question.

"My boy, either I am dreaming or going insane, but there are men—six of them—alighting from that machine! They seem to be—yes, they're wrapped up like divers; helmets and big boots and things. They seem to be pointing to something—maybe the Earth itself. Hello! They're going back inside the ship again now."

"Let me see—please!" Vane entreated.

"All right, but—— No, wait a minute! The machine is moving off—going upward into space. Where the devil—— Oh, yes, I see them again now, to the left. It's hard to follow

them now. Damn! I've lost them! This instrument is too unwieldy to keep in line with them."

The astronomer withdrew his eye and looked at his assistant's eager face and bright eyes.

"A space ship, boy—from inside the Moon!" he exclaimed, his face amazed. "I always thought such things were too fantastic to be true. Yet here it is! On this memorable night of June 20, 1972. Perhaps—perhaps they are heading toward Earth. If so, at the rate they were traveling, they'll be here to-morrow night easily."

"But where have they come from?" Vane demanded. "How in the name of wonder did they get inside the Moon? Do you think that perhaps they bored their way through from the other side—the side we never see?"

Konsicks shrugged. "How can I say? It's hardly likely. The Moon is a dead world all over so far as we know. Inside and out. Frankly, I don't know what to think! Other astronomers will surely have seen the lunar change—the breaking of the Tycho crater floor and the disappearance of the bright streaks. Just a moment; I'll ask Crespin at the New York Institute of Science. He'll be able to check up on us. I still think I must be suffering from delusions, or something."

He returned his glasses to his nose then crossed to the telephone. As was the custom in those advanced days, the connection was immediately made with the Institute. The voice of Reid Crespin, president of the Institute's astronomical section, came over the wire.

"You're not dreaming, doctor; it's an absolute fact! The Moon's face has changed for the first time in history. We saw the bright object leave its surface. Eh? Yes, it looked like a space ship, headed for Earth. Better inform the press."

"Do you think that's wise?" Konsicks asked quickly. "You know—ridicule and so on. We'll never——"

"Don't worry!" Crespin replied firmly. "This has got to be believed. By to-morrow night, approximately, that ship will reach Earth, if it was headed here. I'll tell the press. People must be prepared for this."

"All right, if you think it's best," Konsicks returned. "Good-by, Crespin—and thanks."

Thoughtfully he hung up, and returned to Vane's side.

"Sir, suppose these people are visitors from space? Say—Lunarians?" the young man asked quickly. "Will the Earth be in danger?"

"They are not Lunarians or Selenites, whichever you call them. Those beings I saw were not at all adapted for life on the lunar globe. In appearance they were not unlike us—but considerably taller and broader. A Selenite would, according to all natural law, be somewhat insectile in appearance. Certainly not resembling us. No, Norton, I think those creatures really belong to a world not entirely dissimilar to ours, save that it is perhaps smaller, which would account for these creatures' greater size. But why do we worry? If they are coming, they will be here to-morrow, and they may have the most astounding tale in the universe to unfold. Something that will make us Earthlings realize our smallness. It will do good, too. If they are friendly, they can bestow innumerable benefits."

"If they are clever, they may be hostile," Vane muttered uncertainly.

"Why should they, my boy? That's rather a misguided conception. Cleverness, as a rule, begets friendliness—a desire and willingness to assist those of lesser intellect. Craving for power exists in those who think they are clever and really are not. But all this is needless conjecture. To-morrow will show everything, if at all. I'm doing no more

to-night; I'm too unbalanced. You can go home if you wish, Norton."

Vane accepted with alacrity. "Thanks, doc. I want to tell my wife all about this; she is interested in my work, you know. I shall live and wait for to-morrow. Good night, sir—I'll be here in the morning."

"Good night, Norton." The doctor smiled faintly at his enormous enthusiasm.

Vane went off with active strides, and as he made his way home, once he gained the level mountain road, his eyes were fixed on the Moon sailing serenely through the dark purple heavens. A Moon almost unchanged to the unaided eye, yet actually the strangest Moon that had ever looked down on Earth's busy, teeming surface.

Oddly enough, as he trudged onward—his bungalow was a mile and a half away—a lonely little place near the observatory—he began thinking of the numerous things blamed on the Moon. The tides, for one thing; spells of lunacy at full Moon for another, and above all the fantastic theories extended concerning the side never seen from Earth. As an astronomer he knew that the surface of the Moon never seen, if the whole was reckoned at 10,000 and the diurnal libration neglected, amounted to 4198. From that his thoughts traveled into the purely technical side of his profession, and he reached his home muttering remarks about the mean revolution of the nodes per annum and the mean advance of perigree—— For twenty-seven years of age, Norton Vane was a brilliant young man, and a past master in mathematics.

He found his bungalow in darkness, as he had expected. After passing one more look at the satellite, then at the unending desert and remote mountain ranges that grouped about him in solemn majesty, he let himself in with his key and went silently into the bedroom. With quiet insistence he shook his wife into wakefulness.

She sat up, blinking in the light of the bed lamp.

"Oh, it's you, Nort! For the moment you scared me——" She rubbed her eyes and peered at him under slumber-drugged lids. "What's the matter?" She yawned prodigiously. "Back early, aren't you?"

"Evelyn, the Moon has changed its face, lost its bright rays, and several men are coming from it to Earth. It happened to-night."

Evelyn, her soul, as ever, locked in her husband's work, became abruptly awake at that. With sudden energy she plied him with questions.

"It means something big, Eve," he concluded at last. "Earth is about to receive a visitation—and if there are any trips into space going free I'm in on one. I've always longed to see things above at really close quarters without the intervention of a lens."

"But what about me?" his wife pouted.

"You sweetheart? Well, what do you think? You'll come with me, of course if——"

"That would be wonderful," she admitted reflectively, then lay back and gazed through the window, the curtains being drawn to one side, toward the first hazy streaks of the newborn Californian day. Vane gripped her hand tightly for a moment, as though to emphasize the possibilities of the new day's arrival.

II

DURING the night, authorized by Crespin of New York, the whole world's presses had been at work, and released upon a somnolent Earth the following morning the amazing news.

From New York to London, from London to Berlin, from Berlin via devious routes right across to the Antipodes to Sydney and Melbourne flashed

the astounding message. The Moon had changed! Somewhere in the 240,000-mile gap between Earth and Moon was a space ship, bearing beings similar to Earthlings.

Those with astronomical tendencies held forth to their admiring families over the breakfast cups; those without such tendencies suddenly dug up information from all available sources, and textbooks on the Moon, formerly relegated to a back shelf in the public libraries of the world, suddenly became in insistent demand. In one instance, a Hollywood producer, the instant he heard the news, "killed" production on a revue epic and instead rushed through a scenario concerning, in prophecy, what might happen when the Selenites came. When informed the creatures were probably not Selenites at all, he merely became violent——

Strange indeed the way Earthlings took the news; how a flutter of excitement passed through every living soul on the planet. It changed thousands of people into confirmed scientists, and others into contemptuous scoffers. Dozens of weird contraptions sprang up overnight in various countries, principal among them being old-fashioned telescopes with which to view a quite invisible space ship, and so-called mathematicians who could tell exactly where the machine would land. A thousand and one weird professions sprang up to extract monetary gain from an egregious circumstance.

The general consensus of opinion was that the visitors would be dangerous, and would possess death rays, atom splitters, and deadly disease germs, which they would scatter indiscriminately over the Earth's surface. Speeches in this tempo, gleaned mainly from the stories in science-fiction magazines of that day, were made by weepless orators, and succeeded in paralyzing, before noon on that frenzied June 21, 1972, no fewer than twenty violent stampedes and riots in New York alone, and as many as forty-six in London. Life near these orators was at a premium. Had the orators in question possessed the slightest scientific knowledge things might have been less dangerous.

In the Vermwich Observatory, back in California, Dr. Konsicks and Vane spent an idle day. Their work was normally relegated to the night hours, but knowing what they did, they knew the night was liable, in this instance, to bring amazing happenings. The same tense anxiety existed at the New York Institute, and in the Greenwich Observatory in London. All over the world every scientist and astronomer really worthy of his profession and calling was at his or her post, awaiting the moment when the visitors' space ship would be sighted.

Out at sea, under orders from the scientists, ships were specially searching, from their unimpeded viewpoint, the four corners of the heavens—but in the blaze of the summer day it was impossible to detect anything but the blue sky, of course. Even at night it would have been difficult enough, even with instruments, to detect that relative speck of microscopic dust in the firmament.

It was an amazing day in many ways—hot and thundery in those latitudes experiencing summer—cold and wet in others. Not in every place was the sky clear by evening time, and more than one amateur and professional astronomer gnashed his teeth in impotent fury at a cloudy sky.

It was almost dark when Vane left the observatory to snatch a brief supper at home and then return for the night. Here, in California, the evening was unimpaired. The clear and reliable climate showed promise of a perfect night. Vane felt curiously happy as he swung along; it always stimulated him to discover that something unusual was

ahead of him. The prosaic and normal were anathema to him—hence his profession of astronomer which gave him the opportunity to explore the depths of space.

His wife had the supper ready when he entered, and she shot him a quick glance of expectation as, from long practice, he threw his hat upward to the peg on the door and watched it twirl round the hook into a resting position.

"Well, Nort, has anything happened?" She poured out his tea and handed it to him.

"Not yet. May happen any time, Eve; our calculations show that those visitors should have arrived some two hours ago. Evidently our figures were not entirely accurate."

She faced him across the table as he sat down.

"I've heard from the radio, Nort, that the most amazing things have been happening all over the world," she said slowly. "Just as though—as though everybody's going mad!" She laughed a trifle nervously. "There isn't anything to really be afraid of, is there?" she asked earnestly, her eyes full of wonder.

Vane set down his cup and smiled reassuringly. "My dear girl, do you think that all the scientists of Earth would be waiting so calmly to give our visitors a welcome if they were likely to prove dangerous? Of course not! You've been listening mainly to the reactions of an empty-headed world's population to a momentous occasion. That's all. Selenites, if such they are, don't come every day, sweetheart."

"Maybe that's just as well," Evelyn said reflectively; then brisking into action. "Here—take your choice! Cold meat, jelly, or trifle. You like trifle, Nort——"

She paused, forced into sudden silence, as her ear caught an alien sound. Vane heard it, too, at the same moment, and stopped stirring his tea to listen. It was a queer sound, somehow unexpectedly awesome in the warm silences of the desert that surrounded the astronomer's lonely abode.

It first obtruded into the ears as a thin whine, amazingly high up in the scale in pitch, but as the moments passed it crept slowly down until it became a decided humming—a humming that gained volume with the seconds.

"Quick!" Vane blurted out suddenly, dropping his spoon and hastily clutching his wife's arm. "It's the space ship—the Selenites! Come on—outside!" Without ceremony he hauled her, stumbling with the suddenness of it, to the doorway and outside. They both stood incontinently awe-struck at the sight that met their upward-turned gaze.

High in the almost dark sky, moving against the studded points of the stars with obvious tremendous velocity, was a brilliant gleaming mass. It was moving to neither right nor left, but directly forward, eating up distance and growing in dimensions with the moments. Over the desert hung that beating throb—the roar of tortured atmosphere.

"That's it—coming to Earth!" Vane gasped out, and his wife panted a quick exclamation.

Larger became the mass, and larger; louder grew the din, until it filled all space and every interspace. No engine whistle or volcanic steam could have made such an appalling din as the screech of the projectile machine through the air.

Then presently it came in a line with Earth's surface. It seemed to swing over suddenly to the left and came hurtling like a living mass of screaming flame toward the two in the doorway. Evelyn screamed in sudden fright, but Vane tightened his grip on her arm.

"Don't worry, Eve, it won't hit us. Watch! Good Lord, look!"

STRAIGHT over their heads, at an altitude of perhaps two thousand feet, shot the mammoth machine, every inch of three hundred feet in length, and tapering to both ends. It seemed to be surrounded by a mass of radiating rays and streaks, and as it passed directly above, those same rays beat down for a trice within a yard or two of the astronomer and his wife. Instantly they were flung off their feet and hurled on their faces into the sand of their small garden. Grains shot through the air; the tumult of a hot and blistering wind enveloped them and pressed them flat. Grilling heat hemmed them in.

Out of the corner of his eye, as he struggled to rise, Vane noticed that everywhere those radiating rays were touching, sand and shrubs were flying into dust and nothingness. Even where the solid mass of the mountain ranges were flicked, the rocks blew into a thousand fragments as though dynamited with superexplosive. Then, with a roar, the monster shot to Earth beyond the near-by range, but a radiating mass of snow-white rays pouring into the darkness of the sky revealed where it had fallen.

Dazed and bewildered, Vane struggled to his feet, dragging his startled wife up beside him. Together they looked away to the left where lay the white radiance of rays, the mountain range silhouetted in front of them.

"Well, Evelyn, the visitors are here," he said, his voice grim. "I don't know whether they're hostile or not, but beyond doubt they're radiating something from that ship of theirs that blows ordinary rocks into fine ash. I guess if those rays had fallen directly on us, instead of a few yards away, we wouldn't be talking now."

"They're hostile, Nort," Evelyn said, her brow wrinkled. "They've got dangerous weapons aboard."

"It depends," Vane replied reflectively. "They might have been repulsive radiations to ward off brickbats and things in outer space. Until we've personally seen the invaders we can't tell. The thing to do is to follow them up. Looks as though they have landed about thirty miles away. Come on—I must tell the doctor right away, if he doesn't already know."

"Nort! Let me come with you—please!"

"Eh?" He considered briefly, then nodded. "All right, come on. It's unethical—but then this is an unethical occasion. I'll get the car out while you slip some things on. Bring my hat with you."

The girl went into the bungalow and Vane went round to the small garage adjoining it. Fifteen minutes later he and Evelyn were bumping along the uneven mountain road toward the observatory, their eyes flashing ever and again to that criss-crossing mass of rays and beams beyond the mountains, far more powerful than any known Earthly searchlight. For some odd reason the memory of the rays of Tycho kept returning to Vane's subconscious mind.

Dr. Konsicks had not only seen the space ship's arrival, but was preparing to depart on foot when Vane arrived. He accepted the invitation to go by car with alacrity and seated himself in the rumble-seat, passing comments, during the bumpy journey, upon the possibilities ahead.

Once the desert road was gained, the going was harder still, but knowing the district so well, Vane was able to take the nearest cuts across the hard, sun-blistered sand roads, until he struck the roadway of the second mountain range, some forty-five minutes later. Fifteen minutes more would bring them to the crest of the road where they would be able to see the visitors. The pulses on three people beat faster than normal as a result of this speculation.

Then, as they were nearing the summit of the road, the rays, which had been

blazing over the mountain range far above them, suddenly flickered fitfully and went out. Darkness descended save for the light of the rising Moon, just past her fullest phase.

"Just what would happen!" Vane grunted, driving on steadily by the light of the headlights. "Wonder why they've done that?"

The doctor passed no comment; he seemed to be thinking—but he strained forward eagerly over Evelyn's shoulder as the top of the road was gained. In the valley below lay one of the western-most points of the Yuma Desert, still and silent in the gathering Moonlight. Or so it appeared at first—then, as another bend was rounded, there became visible a faintly glittering monstrosity lying still and dark in the sand, for all the world like a land submarine, if there were such a thing.

"That's it!" Vane shouted excitedly, shutting off the engine and bringing the car to a standstill. "What do we do, doc? Go and look it over?"

"Let's!" Evelyn implored eagerly. "Why not?"

Konsicks shrugged; his eyes seemed a trifle dubious behind their thick lenses.

"Well, since we've come so far, there's no reason why we shouldn't at least—eh—look it over," he answered. "But keep your distance; we don't know what we may encounter."

As excitedly as children on a picnic, Vane and his wife clambered out, assisting the more staid and mature doctor after them. Then, with cautious steps they made their way through the loose sand toward the apparently lifeless monster. They wished they could detect some sign of life—a light, or something. The sudden cessation of the rays and the silence was somewhat disconcerting when so much had been expected.

"Guess it looks like a fizzle," Vane grunted, when they had approached to within a hundred feet of the vessel. "Nothing doing! It isn't hot through passage through the atmosphere, which in itself is a mystery. We'd better wait till daylight, doc."

"Perhaps you're right," Konsicks agreed. "Certainly we——"

He broke off in mid-sentence and stood transfixed as, with a suddenness that left no chance of escape, there blazed from the silent ship a brilliant white beam. In an instant it had enveloped the three adventurers in its blinding light.

They staggered back, arms raised to their faces.

"Run for it!" Vane gasped out suddenly. "We're spotted! We're——" He broke off, blinking in the intolerable glare, as he abruptly found himself facing an individual who had appeared with utter silence from the darkness beyond the searchlight's radius.

"Oh!" gasped Evelyn in alarm, catching sight of him at the same moment.

Dr. Konsicks said nothing; his mild blue eyes were filled with plain surprise.

THE MAN, for such he appeared to be, was perhaps seven feet six or eight inches in height and of proportionate width. His attire seemed to consist of tight-fitting leg coverings and a loose, much-embroidered smock. Head covering he had none. Fortunately, the face was not of a ruthless or cruel type, but rather one of good-humored tolerance and understanding, yet withal powerful and firm. Altogether a fine-looking creature, with his extremely hooked nose, high cheek bones, and, surprisingly enough, red eyes and snow-white hair, akin to an Albino. Certainly his white hair was not occasioned by considerable age, for he appeared young.

For a long time this remarkable person looked at the three in complete silence, then he raised his arm and pointed, presumably in the direction of the space ship.

"Go on," muttered Konsicks. "I think we can trust him."

Cautiously, as though expecting something startling to happen any moment, Vane led the way, Evelyn clinging to his arm. The doctor came up in the rear, followed by the giant with the red eyes. As the party moved, the searchlight followed them, until Vane found himself walking into an area where the light was more tolerable. He moved slowly now, amazed at what he beheld, turning to read the same expressions of wonderment on the faces of his wife and Konsicks. The astronomer himself was peering through his glasses with the earnestness of a bird on a wet garden lawn.

Came a clicking sound; the door had shut. The three looked about them at the well-lighted apartment of metal in which they found themselves—an apartment stacked with mainly incomprehensible machines and devices from end to end, besides which the control room of a submarine would have seemed the veriest child's nursery.

The giant with the red eyes motioned to an affair resembling a ship's bunk, and in response the three Earthlings sat down. The visitor vanished into an adjoining apartment, to return shortly with five companions, all remarkably similar to himself in appearance; but from his manner he was clearly the leader. Then, at last, he spoke, in a deeply melodious bass voice, raising his arm at the same time, in the manner of a salute.

"*Mavi kanji roonar!*" said his profound voice.

"That's Greek to us," Vane responded. "We don't understand your language, chief, nor you ours, I suppose. What are we going to do about it?"

The man's bright-red eyes became thoughtful, then he tapped his mighty chest, afterwards pointing to Vane. Several times he repeated the action before it dawned on the young astronomer what was implied.

"He means will I teach him the language!" he exclaimed, turning to the others. "How about it, doc? Shall we try?"

"Surely," Konsicks assented. "Your wife and I will assist. The sooner we get the language difficulty over, the sooner we'll know something about all this."

So began the first bridging between two worlds. By pointing to various objects and supplying the Earthly word for them, the three managed, little by little, to impart their language to the huge visitors. They proved to be amazingly quick to grasp every detail, and once they heard a word they never forgot it. In all, it was a task that took only seven Earthly hours—until the summer dawn, in fact. In that time all six men knew enough to talk with perfect fluency, whereas the Earthlings had barely gained the rudiments of the visitors' language. Obviously, the mental powers of the giants were some three times greater than an average clever Earthling.

Weary but successful, the three were able to relax at last, and with that the leader motioned his comrades from the apartment into an adjoining one.

"First, my friends, let me extend to you our friendship," he said quietly. "My name is Mayro. We do not come as enemies, intent on ruining, conquering or stealing your planet; rather we would like to bestow our knowledge upon you. For a space of roughly ten ages we have been asleep, in a state of suspended animation, in that mighty mausoleum known as your Moon. So be it, then. We ourselves, inside this space ship, have slept within your Moon ever since your Earth was just beginning to cool."

"What's that?" demanded Konsicks, rising up as the import of the visitor's words penetrated his brain. "What did you say?"

Mayro smiled and repeated his statement. Vane and Evelyn listened in silent but deeply interested curiosity.

"It is a strange story—perhaps the strangest ever told," Mayro went on pensively. "I will tell it to you.

"COUNTLESS ages ago—the exact time I cannot remember—I set out from my native planet with my companions—my planet being situated, in a galaxy some forty thousand light years beyond your nearest star—on a tour of space exploration. We had been masters of space travel for many ages, so it was nothing new to us—but we were always trying to explore farther and learn more. On this occasion, due to a defect in one of our guiding compasses, we lost our way in space. We wandered about the cosmos, completely lost, and wondering if perhaps death would not be the best way out. Then it chanced that our wanderings brought us to a cosmic birth; we saw the birth of your solar system and its nine planets, and our course brought us, when Earth had cooled down into a semisolid state, to your planet.

"My comrade, Zanos, suggested that instead of death, it might be more interesting for us if we waited until the world of Earth bore men upon its surface. We could drive our space machine deep down into the depths of the Earth and use the repulsive forces of our ship's metal to keep away the pressure of hardening soil and rock. You see, the metal of which this ship is composed normally emits perpetual energy, in the form of brilliant rays, which are actually force—something akin to your radium. When these rays are in action the metal becomes transparent, but the application of a current, which is on now, stops both the rays and the transparence, turning the metal into an inert opacity. You understand?"

"Yes, yes," Konsicks nodded eagerly. "Go on! Did you bury yourselves?"

"Assuredly we did. We drove our ship deliberately into the depths of the soft, moist world, and then switched off our metal current. That meant our metal became immediately repulsive and surrounded us with an area of unbreakable force, so we could never be crushed by surrounding forces. Ultimately, we realized, the surface above us would split in two under the enormous strain from below, but not before millions of years had passed. We knew this would occur—figures proved it—and we knew also that our metal had a life of some twenty million of your years before it lost its powers, so we decided, until that time should come, we would place ourselves in a state of suspended animation. But, once the ground above us cracked, allowing the Sunshine to reach us through the transparent walls of our ship, an automatic instrument would react at the Sunlight and actuate a spring, setting forth a compressed air cylinder, preserved through unguessable centuries by the ultimate of cold, within a vacuum. So, slowly the temperature would rise by the Sunlight and the air would come as well. We would awake—we did awake.

"We arose from our condition—a condition that was death, yet life. Before we had succumbed, the air had been entirely pumped out of our chamber, our ship, and machines had reduced our mental and physical vibrations to almost zero. After we had relapsed into that long sleep, automatic machines had reduced the temperature of the ship to 273.1. degrees on our Centigrade thermometer—the cold of space itself. Then, as I have said, we awoke again, but our tests revealed there was no air outside our ship, and that the temperature was that of 98 marones, or five hundred of your Farenheit degrees! What in the cosmos had happened? This was anything but what we had calculated.

"Deeply puzzled, we donned space suits, capable of standing extremes of heat and cold and airlessness, and raised our machine through the chasm our repulsions had made, to find ourselves in an immense crater. We found a light

gravitation, a dead world, a sun from which the prominences streamed and round which hung the halo of the pearly corona—and above all a gigantic world, not very far across the void, obviously alive and possessing clouds and atmosphere. For a time the mystery baffled us, then we began to understand. By some amazing mischance, which we had never reckoned with, we had imbedded ourselves in the portion of the still hardly cooled Earth which ultimately must have broken off and become the Moon. We felt nothing during that wild transit across space; our radiations protected us, and our ship was likewise impervious to heat or cold. All the violent convulsions the Moon had gone through during her cooling period also had left us untouched for the same reason. So you may imagine our dismay at finding ourselves on a dead world—Earth's mausoleum, indeed. You never guessed six men from the cosmos lay within the moon, did you?" Mayro's face creased in a broad smile.

"Never," Komsicks returned with conviction. "I begin to understand at last. The bright rays and streaks from Tycho and other points, Vane, were obviously caused by the radiations of the buried space ship. That is why they were not blocked by anything solid—— I presume they're not?" he asked, looking up.

"Correct." Mayro assented. "Although they repulse, they pass through all solids—or at least the light part of the emanations do. The actual emanations themselves block a solid, of course. Resist it, so to speak."

"Which explains why the radiations vanished when you awoke," Komsicks went on thoughtfully. "The radiations must have got through the weakest parts of the Moon's surface—Tycho and so forth, and ultimately broke the floor of Tycho crater in two. That permitted sunlight to stream down, pass through the transparent walls of the ship and wake you. Then you switched on the electric current which caused the rays to vanish and your ship to become opaque. Then you came to Earth, rays in full blast——"

"Certainly our radiations were in action," Mayro assented. "We use them for the dual purpose of propulsion and repulsion of unwanted bodies. These same radiations also prevent friction from atmosphere and keep our ship cool. Perhaps we caused a little damage when we were landing, but that was unavoidable. We chose this desert as it seemed the quietest spot. Our last wish is to injury anybody. All we desire is to see what sort of a world evolved out of the solar gas we once saw. Manifestly it has bred intelligent creatures, though it must be admitted you are not so high in intellect as we are. Perhaps we can help you? We came with that object in view."

Komsicks considered, then glanced at Vane and Evelyn.

"That's kind of you, Mayro, but—— Well, you see, we Earthlings are a conservative sort of race. We resent interference, or being taught anything. I do not mean that we three personally are that way—rather the contrary—but I speak of those who are not scientific, of the great masses, which unfortunately comprise the vast majority of our Earthly population."

The giant nodded slowly, that faint smile once more appearing on his powerful face.

"I think I understand, friend Komsicks. Still, your races would surely be interested in the colonization of the Moon?"

"Colonization?" Vane repeated in amazement. "You talk of colonizing a dead world?"

MAYRO shrugged. "It is dead by natural standards, I agree, but science can very soon revive it and transform it into quite a useful annex to the Earth. I have to admit my surprise that it has

not been already done, but obviously, since you know no way to cross space, you have literally arrived at a dead end. We can colonize the Moon for you—nor is that all we can do. We can bestow upon you many useful gifts from our own scientific knowledge."

"Such as?" inquired Konsicks curiously. "We have radio, you know. And television."

"Useful, but commonplace," returned Mayro calmly. "Such things as cold light, the transference of matter, the transmutation of elements, the harnessing of the tides and the control of the weather may also interest you. You can have all those gifts if you desire them."

Konsicks got slowly to his feet; he surveyed Mayro steadily.

"Mayro, I am an Earthling," he said quietly. "Inborn in me are the traditions and instincts of my race. One of the unwanted traits in an Earthling's make-up is to be suspicious. That is just what I am now. You offer all these scientific marvels to us, but it is only natural that you demand a price in return."

The visitor shook his huge head. "For a man of science, friend Konsicks, you reveal a surprising limitation of knowledge. We ask no price! We are wanderers from space—lost, our world by this time dead and airless. In return for only the safety of your planet; in return for the leisurely study of Earthlings without in any way interfering with them, we offer you our knowledge. Nothing more—nothing less. I have five companions, as you are aware, and all have no intention of hostility. We can, of course, defend ourselves when attacked, and tolerate no injustices or wrongdoing, but of ourselves we are never the aggressors. We come—as friends!"

Konsicks hesitated at that and glanced at the intent Vane and Evelyn. Vane nodded earnestly to signify his approval of the visitor's offer.

"Well—er—I am in rather an awkward position," the doctor said. "Really, you are placing me in the light of Earth's ambassador, which is too mighty a responsibility to rest entirely on my shoulders. My suggestion is that all six of you accompany us to the New York Institute of Science. It is the greatest institution of its kind on our planet, and deals with all branchers of science. The head of the astronomical section, Reid Crespin, is a personal friend of mine—a man of broad views, penetrating brains, and absolute fearlessness. If anybody can make the world believe in you, he can! He knew of your coming, just as we did. We happened to be nearest; that's why we came first."

"I understand," the giant nodded. "Our detectors showed us somebody was near our vessel; that was why we switched on the searchlights. It was the first time we had ever seen Earthlings. Strange you should resemble us, though on a smaller scale. In all, we have visited some five hundred and eighty planets in our travels, and not a single one has held life resembling our own. It is fortunate that in face and body formation, at least, we are similar. But I digress, my friends. We will visit this Crespin right away."

"I would suggest a little later, when the day has fully come," Konsicks said. "My companions and I are tired; teaching you the language was a strain on us. Besides, we sleep at night."

Mayro shrugged, then crossed to one of the six windows in the wall and snapped back a metal shutter. The vision was one of steadily approaching day across the emptiness of the desert.

"It is nearing day," he commented. "Still, we will go when you desire it. Return to your abodes and come back when you are refreshed. We have no wish to overstrain you."

Konsicks stifled a yawn. "We'll do that, then. We'll be back by mid-afternoon when we have eaten and slept a

little. In the meantime, guard yourselves against sight-seers. Plenty will be along, I expect."

The giant nodded as he opened the door of the vessel. "Have no fear, Konsicks. We know how to protect ourselves. We shall eagerly await your return."

III.

IT WAS toward three in the afternoon before the three returned to the visitor's space ship, refreshed with brief sleep and a meal—and, as they had anticipated, a fair-sized crowd of people was gathered round the monster, talking and pointing excitedly.

"Just what I expected!" Vane grunted. "Why the devil can't people keep their noses out?"

"A space ship doesn't fall every day Norton," Dr. Konsicks answered. "Come—we will have to force our way through."

This proved to be a task more difficult in practice than speech. The sight-seers certainly did not believe that the three newcomers were acquainted with the unknown and as yet unseen creatures inside the ship; they merely suspected, humanlike, that they desired a closer view, and as a consequence the three unwittingly let themselves in for a good deal of rough handling. The crowd was mostly composed of a hooligan element—unimaginative young men and women who had been willing to brave the rocky roads of hill and dale for the sake of stimulating their curiosity. As yet, no experts had arrived on this out-of-the-way spot. Probably because the ship's location had not been fully determined.

It was as they neared the space ship that Evelyn was suddenly knocked to the ground by an aggressive brute of a fellow, head and shoulders above the small knot of "toughs" who were obviously his companions, upon whose foot she happened to tread. Vane wheeled round, eyes glittering, and retracted his arm for a blow—but before he could land it another rough behind him sent him spinning. Dr. Konsicks stooped down to help the fallen and frightened girl, but he, too, was legged down.

"Say, grandpa, what's the big idea?" the massive hooligan demanded. "Thought you'd get a good look, huh?"

"You infernal blackguard!" Konsicks shouted furiously. "How dare you——"

"Aw, shut up! Any more from you and we'll——"

"You will what?" inquired a deep bass voice from behind the hooligan's ear—and he spun round, fists clenched, to do battle with the new aggressor. It came as a violent shock to him, however, to find the creature was nearly twice as broad and head and shoulders taller. Eyes of bright red, filled with a light of intense fury, were glowing strangely. With one surging movement the crowd fell back, chattering nervously. How the giant had arrived nobody could quite make out; he had just—come.

"Mayro!" Vane gasped thankfully. "Thank goodness you've come along." He helped his fallen wife up and dusted the sand from her clothes. "This damned hooligan here——"

"I saw everything," returned Mayro's calm voice. "We are a peaceful people, Earthling"—this to the dazed hooligan—"but when you interfere with our friends it is then that you anger a race who could, if necessary, exterminate you into fine powder at a second's notice! That is not my way; you are the first offender, therefore I shall at least spare your life. You did, however, cause this Earthly lady and her husband quite unnecessary pain; therefore, I shall repay you in your own coin. It will perhaps teach you a lesson."

"Look here——" the man began savagely.

"Like this!" Mayro added calmly, and with a suddenness that was devastating he flung out his right fist with the speed of a lightning bolt. The result was

truly astounding. The blow struck the scowling hooligan under the jaw, and such was the terrific force of the giant's biceps that it lifted him, powerful man though he was, clean off his feet. He turned a complete drunken somersault through the air and crashed down with his face in the sand, utterly winded, and no doubt suffering from a broken jaw.

"Excellent," Mayro said in satisfaction. "Now, my friends, come inside." He escorted the three into the ship and securely locked the door behind them.

"Mayro, you shouldn't have done that—decent though it was of you," Vane exclaimed. "Hooligans like that are the last type to inflame to violence. If that fellow has a strong following, and he seems to have plenty of colleagues, he might do some damage."

The giant laughed softly. "You need have no fear, my friends. There is nothing on this planet that can interfere with us. I trust our aggressive enemy has suffered for his behavior.

"How in the world did you know all about it?—arrive so quietly?" Konsicks asked curiously.

"Merely the transference of matter, which I mentioned last night. In the first place, I saw your treatment via our periscopic devices, and also heard the altercation through our sound-wave apparatus. That being so, I did the same as last night—I projected myself by an automatic machine, requiring no operator, into the crowd. It is quite a simple process—to us. A body is rotated into hyperspace, moved for any given distance through all solids, and then made to materialize again at the desired point.

"Everything is determined beforehand—the distance and so forth—and the setting of the machine at the commencement saves any operator having to bother it while the transmission is made.

"Anybody can go anywhere by that process. I often use it; saves a lot of time, particularly in difficult situations."

Mayro paused and looked about him, nodded toward his five white-haired companions who had just entered the control room. "We are ready for the departure to friend Crespin," he remarked.

"Right," said Konsicks. "I told Crespin you'd be coming—be there about nightfall, I said—depending on your vessel's speed. I said you'd go in the ship; is that all right?"

"Perfectly—granting there is somewhere we can land."

"Crespin is having the Institute grounds cleared for you. There'll be ample room."

"Excellent! We will start at once."

MAYRO turned to his colleagues and gave brief orders. In response they turned to the complicated control panels and busied themselves with numberless switches and levers, their red eyes glued to the strange meters on a level with their great height.

"What about the people below?" asked Vane suddenly, in alarm. "If you're using your radiations, you'll kill them and——"

"Have no fear, friend Vane. For normal flight through the air we do not use our radiations. Purely a system by which we adhere immovably to the electric waves that are eternally passing through every atmosphere, which have seeped down from the electro-magnetic ether beyond. That makes a fall impossible, and also provides enormous momentum. Our only need is a recoiling power which is generated from a copper bar at either end of the ship, depending on the direction of travel. I believe you use the antiquated system of a propeller—— Ah! We are on our way. Come to the window; you must guide our route."

From the main observation window the three Earthlings looked down on the milling crowd below, the majority pointing skyward. Some had fallen over

with the terrific back draft; still others were shaking their fists at the fast receding ship. Vane and Konsicks—and Evelyn, too, in a lesser degree—had an uneasy feeling that a very inimical start had been made with Earth's only too-temperamental people.

"How far is this New York?" asked Mayro presently.

"Some three thousand miles," Konsicks answered. "How long will it take you?"

"Oh, roughly thirty of your minutes," came the astonishing answer. "I must apologize for the slowness. Were we in space, unimpeded, we could be there almost instantaneously. Even here we could be in New York instantaneously by the transference of matter, but I think it better that Earthlings see our ship as well as us."

"Thirty minutes!" Vane expostulated. "Why—that's six thousand miles an hour!"

"Exactly so. Trifling indeed compared to the speeds at which we can cross space. We took a very leisurely journey from Moon to Earth. When speed is really necessary, we can easily reach the speed of light, and once we attained a velocity of nearly 744,000 miles a second, which is four times light's velocity."

A silence fell at that. The matter-of-fact way in which Mayro remarked upon incomprehensible speeds was a little too much for the Earthlings to grasp. They allowed the matter to drop and contented themselves in marveling at the smoothness with which the ship hurtled onward through the air, already well over the arid regions of New Mexico.

So onward with undiminished speed across Kansas and Missouri—until at last Indiana, Ohio and Pennsylvania had passed beneath. At times there were glimpses of people staring upward from the streets, though it was probable that everybody knew what it was all about—and in New York itself it was obvious that all people were aware of the coming of the visitors.

Surrounding the immense grounds of the Institute of Science, west of the metropolis, was a mass of people as far as the eyes could reach, held back by lofty iron railings and an army of mounted and foot police. From end to end of the great city the news had spread, thanks to Konsicks' message to Crespin, of the coming of the creatures from the cosmos, who so long had been buried in the mausoleum of the Earth, as Mayro insisted on poetically terming it.

The space ship alighted softly on the grounds and came to a standstill. When the door was opened the roaring of the people smote like something solid from the boundaries. Mayro stood looking about him for a moment, then his eyes lighted on a small deputation approaching steadily.

"It's Crespin himself," Konsicks remarked, moving forward. "He's got radio and television transmitters with him, too. See those men bringing them up in the rear? You're going to be shown to the world already, Mayro."

"Why not?" asked the giant quietly. "The sooner the better, I imagine."

Presently Crespin came up, flanked on either side by the television experts, the newsreel and newspaper men, and several governmental officials and scientific representatives.

"You are Mayro?" Crespin asked, his lean face full of affability.

"That is so," conceded the visitor calmly, then motioned to his racial companions. "These are my comrades—Zanos, Liret, Vemor, Halo and Kismad. Behind them are my Earthly friends."

"Quite so." Crespin nodded, and subdued a smile as he beheld the reporters' shorthand struggles with the unusual names. "In the name of the United States, and in the name of the planet Earth, Mayro, we welcome you to our planet and city. We have learned the

basis of your plans from Dr. Konsicks of California, and now await your own personal verification. Will you give a televised and radio address to the people of the world to-night, from the Institute of Science?"

"Willingly," Mayro nodded. "While I am on this world, it is my desire—and that of my comrades—to conform to your standards of living. We will make the Institute our headquarters for the time being."

"You will be treated as honored guests," Crespin replied. "Will you accompany us to the Institute, where a banquet has been prepared?"

"Does a banquet include Earthly foods?" Mayro asked doubtfully, and on being told it did he shook his head slowly. "I am sorry, but we must withdraw from that. We only use specially-prepared substances, by injection. We will come—but not to eat."

Crespin shrugged. "Entirely as you wish. Come along, gentlemen—all of you; and to you, Dr. Konsicks, belongs the honor of being the first to discover the change on the moon."

"No—to Norton Vane here." Konsicks quickly corrected, and at that Vane smiled somewhat shyly for the battery of cameras and patted his wife's clinging arm reassuringly.

Then, the entire party, visitors and visited, moved slowly and sedately toward the mighty square bulk of the Institute of Science.

At nine o'clock, the banquet over, Mayro turned his attention to the broadcasting room with which the Institute was equipped, and, under Crespin's directions, took his stand before the television transmitter and microphone.

For nearly three quarters of an hour he dealt solely with his experiences prior to the awakening of himself and his comrades within the Moon—then passed on to his offer of scientific knowledge in return for the safety of the Earth.

". . . under our directions, if you are willing to follow them out, we can colonize the Moon, control Earth's weather, harness the tides, and accomplish countless new improvements. The benefits would be incalculable."

"Of what exact use would it be to colonize the Moon, Mayro?" Crespin asked.

"An extra-planet if rendered habitable, is surely useful?" Mayro asked in polite surprise. "Think of the extra room there will be on Earth. This world is much overcrowded. Your unemployment problem, too, is considerable. Annexing the Moon would reduce that unemployment, and further ideas we have in mind would indeed render unemployment a thing of the past."

"Well, it is entirely up to the world's peoples to decide the issue," said Crespin. "For myself, I give my unhesitating assent, but you men and women watching and listening now"—he turned to the transmitters—"are the grand jury in this matter. All I can say is, show yourselves to be generous to our visitors, and in return we will reap a rich harvest. Don't be afraid to admit that there are people cleverer than yourselves; that the knowledge that has come out of cosmos is far and away greater than anything we have ever attained yet——"

So, practically on that note, ended the broadcast, and half an hour later the visitors returned to their space ship, closed the impregnable doors, and vanished for the night from the eyes of the surging populace around the grounds of the edifice, struggling and fighting desperately to gain a glimpse of the men who were going to change the earth.

FOR A week after the tele-broadcast, Earthlings squabbled and bickered among themselves, like children over a ball, concerning the visitors' offer. Opinions were conflicting in every direction, but curiously enough it was the gigantic problem of the world-unem-

ployment, still rife even in those advanced days of 1972, that decided the issue.

To accept Mayro's proposal would mean employment for tens of thousands of men and women, skilled and unskilled—so, with due formality, there ultimately came from every country's presiding government or dictator an official sanction, plastered with seals, for the visitors to proceed with their plans. Followed much signing upon strips of tough parchment, and the appending of monstrous masses of sealing wax to silk ribbons, all of which Mayro and his comrades viewed with faintly amused interest.

They failed utterly to comprehend such legal procedure, but were too polite to pass comment.

The day the acceptance of the visitors became world-wide, Vane, Evelyn and Konsicks joined Crespin and the visitors in the main laboratory of the Institute. A few outsiders were present, mainly government representatives who would take the first orders from Mayro.

"Firstly, we will harness the sea and do away with your foolish power houses," Mayro said complacently.

"That has already been done," Crespin answered promptly. "In some parts, tide mills are used to create power where tidal action is considerable. A basin is flooded twice a day and drives a mill wheel with a small head. The only drawback is that the power is intermittent, of course, and comes at different times of the day."

"Quite! An elementary version of the real thing, friend Crespin. On our world we used to harness the sea perpetually. We had approximately seven thousand rotating spindles, not unlike gigantic screws in shape, all along the shores of our principal oceans. These screw bars revolved perpetually with the waves and went out far enough to reach low tide—so at high and low water the waves were perpetually giving a driving power since they always moved the same way. Farther back from the shore reposed a power house, and the combined energy of the seven thousand rotating screws was synchronized by various machines, and then passed into the power transformers. Thence by wires to the various centers requiring power. That is what we will do along Earthly coasts, my friends. Power for nothing! You have very little conception what enormous resources and facilities lie in a world's own natural properties."

"True." Crespin nodded thoughtfully; then looking up. "You said something, too, about weather control."

"Similarly simple. Weather conditions are produced by constantly changing pressures and electric charges in the atmosphere. The correct electric radiations, released from immense power houses—driven by the tides themselves—will keep the pressures in the atmosphere on a level keel, and can be altered at will to produce either rain or sun as desired. The transference of matter I have already explained to you. The colonization of the Moon is the biggest project. It will be necessary for an expedition to visit the Moon in space ships, which will be built on similar lines to ours, only much larger. We will take with us all the material necessary. To decide on those materials will of necessity take some little time, and in any case I do not plan to undertake the colonization for a year. It will take me that long to make the necessary terrestrial improvements."

Crespin nodded. "Very well, Mayro. You are, as you know, virtually in control of the Earth and its peoples. Everything is in your hands, in the matter of future progress, anyhow. If you can model a useful world out of the formless clay you have to go on, all power to you! Eh, Vane?" The young astronomer nodded emphatically.

"You will, I suppose, select certain people to aid you?" Dr. Konsicks asked.

"Of course. You, doctor, shall be my closest adviser on Earthly matters, of which, as yet, I am mainly ignorant. You, Vane—and your wife—will be extremely useful in positions of authority. You can do much with the men; your wife with the women. And to you, Crespin, will also be extended a similar authority. Indeed, when the departure is made for the Moon you will be the one I shall hope to leave in my place, in charge of Earth's peoples."

"Suits me," Crespin answered with a faint smile. "And now let's get to business. The world is waiting to see something."

"The world will see something," Mayro returned with conviction. "Have no fear of that, friend Crespin!"

IV.

SO, onward from that memorable day, began the vast improvement in the constructional scheme of the world. The visitors, headed by Mayro, went about their plans with ordered and patient infallibility, never once causing the slightest friction, always willing to listen to suggestions for alteration—but crushing needless slackness and bad workmanship with a relentless hand.

The outcome of it all was a changed and unrecognizable world twelve months later.

The One-Year Plan was perfected to the day—on August 10, 1973—and, had a visitor been in space for that year, he would certainly have thought he had landed on a different planet to the one which he left, so changed was the new Earth from the old.

Disintegrators and assemblers had done away with all the old cities. London, New York, Paris—every principal city—had been moved with speed and efficiency, literally rayed out of existence. In their places reposed cities in the sky, built upon colossal platforms, rearing some five hundred feet from the ground. The vast pillars of incorrodible steel supporting the cities were sunken into revolving turntables far beneath the Earth, balanced to perfection, and able to turn when necessary by electricity—in order to have constant sunlight—which electricity was generated from the stupendous power houses that utilized the natural energy of the nearest ocean!

Connecting these sky cities were suspension bridges, able to fold or extend at will. Thus had mankind suddenly taken to the freedom and dustlessness of the sky, leaving below perfectly free ground space, which was utilized for high-speed vehicular traffic, able now to take the shortest routes being unimpeded by buildings. In every quarter, too, particularly in business, the hyper-space matter transferer was in great demand, mainly for the time it saved.

In the earlier days of storms and uncertain weather the sky cities would have been destroyed within a few months, but now, thanks to the faultless weather-controlling machines installed the world over, the weather always maintained a perfect calmness—giving way to soft rain or sharp frosts at the desired times. Gales and thunderstorms were forgotten nightmares that once terrorized the seaman and ruined the farmer.

Beneath the Earth had been tunneled an enormous underground railway, just under the Earth's crust, through which hurtled streamlined trains at a speed of nearly three hundred miles an hour, passing, if necessary, right around the world and under the beds of the deepest oceans. The gigantic underground stations where these hurtling monsters paused for their freight had become places to marvel at for the essence of power and knowledge they flung at still puzzled Earthlings. Vaguely it was understood that Mayro's disintegrator machines had blasted away the toughest rocks into nothingness. A single ray-gun squad could accomplish in five

minutes what old methods would have taken as many weeks to do.

Through the air, high atop the sky cities, floated the latest devices in air machinery—roman airships. Amazing liners, equipped with vacuum copper globes, intake port engine rooms, revolving fan blades, fly wheels with gyroscopic action, and ports opened by rotating sleeves—the entire craft gaining its lifting power by the buoyancy of a vacuum filled with a strangely multiplied power.

And lastly, across the Earth itself, shot queer glittering balls, deeply sunken within a curved railroad, and capable of a speed, at maximum, of something like six hundred miles an hour. Within these balls reposed the gyroscopic compartments, maintaining everything on a level keel while the outer shell revolved at a stupendous rate, hurling the vehicle with the speed of a superbolsleigh down the appointed tracks.

Everywhere was speed unbelievable! Speed!

And across the sea moved ships controlled by distant radio, and others equipped with high-speed engines. The secret of atomic force was still one mystery that eluded even the brilliance of the visitors, though they were constantly working upon the problem.

The colossal alterations had, not unnaturally, caused the unemployment of a stagnant world to suddenly vanish. Every man and woman had an appointed place in the new scheme of things; everybody of a rational nature was entirely satisfied. Indeed, only a certain section of the extremely low classes, who had opposed the visitors ever since their arrival, gave any sign of trouble. The band comprised, it appeared, some five thousand—a mere unit in the face of Earth's happy multimillions, but nevertheless, a force just unpleasant enough to cause Mayro much disgust that he had not a perfectly unanimous world when——

"I would like to see this James Rawson, the leader of these discontented people," he confided one day to Crespin, when the whole Ruling Community had gathered together in their controlling edifice—the highest sky building in New York II. "You see, Crespin, we start off on our lunar project to-night, and I do not wish to leave you here alone, to grapple with these lunatics. True, you have all the world at your back, but the opposers are without sense of justice or morality. They will sneak in by devious routes, destroy our power plants, lay the seed of discontent among the workers—maybe ruin all our work, without you being aware until it is too late."

"I think you worry needlessly over that," remarked Ramsey, chief mathematician to the Community. "Crespin can take care of himself——" Then, as though he were suddenly afraid of being asked questions, Ramsey turned away and stared out of the window upon the crazy panorama before him.

"I'll take a chance," Crespin replied grimly, his powerful chin setting firmly. "As for seeing Rawson face to face I don't think you'll ever manage that. He always keeps in the background. He has agents and spies, and a major-domo to do the talking when a personal contact becomes really necessary. Forget it, Mayro! It would take a supermind to disorganize this immensity of power and purpose. You have brought to our world an immeasurable degree of happiness and surety. And now you go to conquer another one and open it up; unearth its precious minerals; extend Earth's ramifications—split up into reborn life that very mausoleum in which you and your comrades were so long asleep."

Mayro nodded slowly. "And when it is done?" he asked thoughtfully. "I wonder what then? I have enjoyed this work—this progress; but when everything is finished and we have nothing more to do——" He stopped, then

The giant had no chance to complete a protest. The gun blazed, and only a tiny heap of ashes remained to bar their progress.

shrugged his mighty shoulders and smiled faintly. "I am delving too far ahead, my friends," he apologized, looking around. "We must get back to our project. Vane, is everything in readiness?"

The young astronomer nodded. "Everything. Fifty space ships, exactly to scale on your drawings, have been built, stored, and generally prepared for moon-colonization. They are waiting at the space grounds. Departure fixed for eight to-night."

"Excellent. Dr. Koesicks, are the men ready?"

"Yes—every man of them, all volunteers, with the exception of our own picked party. Of those present here,

Vane, his wife, Ramsey, and of course you and your companions, will be going. You have the women ready for departure, too, Evelyn?"

"Yes," the girl nodded quickly. "They will be very necessary, too, to attend to matters at which men are only too futile."

"There may be danger—for women," said Mayro quietly.

"Women will risk danger if they love their men," Evelyn replied unflinchingly, and at that the giant scientist slowly inclined his white head.

"So be it, Evelyn. We will start to awaken the Earth's mausoleum—at eight to-night!"

AT eight o'clock, to the minute, the fifty space machines, composed of metal exactly similar to that of the visitors' ship—rendered possible by transmutation of elements which had finally produced the ray-emanating metal—took to the air, propelled through the atmosphere by the electric wave system——

Below, in the calm Sunlight of the perfect summer evening, stretched a multitude of cheering people, bidding God-speed to those six men from space who had made heaven out of a world of incomparable chaos: bidding them luck on their daring project to give the Moon a second birth.

Then, in an amazingly brief stretch of time, the space ships, headed by Mayro's own machine—in which were he himself, his five colleagues, Konsicks, Vane and his wife—burst through the atmosphere's limits and into the void. Instantly the blazing radiations of the repulsive metal came into life, hurling the vessels away from the receding Earth at ever-mounting speed. Acceleration was hardly noticeable, owing to the various devices with which the ships were equipped. Save for a slight pressure on top of the head nothing untoward was apparent.

The Moon, at the full, hung already clearer and larger in the flawless black of space, the stars and stardust passing dead to her edges, revealing only too clearly the absence of air. Behind, surrounded by the pink curtain of her atmosphere, was the crescent Earth, three quarters of her surface enveloped in somber green.

To the Earthlings, the view was one of surpassing wonder—the sheer beauty of celestial harmony took their breath away. They felt unable to tear themselves from the window, and indeed were quite irritated when the mature and cosmos-wise Mayro ordered them to rest, before the strain of constantly tolerating the slight acceleration pressure and blinding glare of the Moon upset their nerves.

So they retired to their bunks; in quarters specially prepared for them, slept very heavily, and awakened to find the vessel seemingly still. Through the portholes poured a harshly blazing white light, akin to arc lights trained on the whitest snow.

Puzzled, Vane and Evelyn entered the control room, to find Konsicks there with the visitors.

"We arrived about an hour ago," said Mayro quietly. "The glare you see is the Sunshine on the crater walls. We have landed on the floor of Tycho. One half of our fleet is on the other side of the chasm—the chasm we created when emerging from the Moon's interior."

"We have arrived so soon?" Vane asked in astonishment.

"Why not? Have I not already told you of the speeds we can attain when necessary?"

"But there's no difference in gravitation——" Evelyn began.

"Purely because our floor gravitators are still at work," Mayro replied. "You will notice the difference when we get outside. I have communicated with the other ships by the short-wave radio system. They await our orders. The task must now begin."

"How?" Vane asked after a pause. "You have explained very little, Mayro."

"True; mainly because I thought that, back on Earth, should the news leak out, our enemies led by James Rawson might upset things. Here, I am free to speak.

"We have brought with us the wherewithal to build upon the Moon some twenty enormous towers, which will be placed in convenient positions amid the 14,600,000 square miles that comprise the Moon's surface. These towers will generate immense quantities of gas—oxygen and nitrogen being in the highest percentage. In time this gas will form into an atmosphere—that is the first thing we must do, and the density of the air we form here must, of course, be considerably more than that of Earth's, for here we have only one sixth of Earthly attraction. The Moon's gravitation will hold the atmosphere down, of course. All the work with the towers we shall accomplish in the space suits we have brought with us."

"It's going to be a big task," commented Konsicks reflectively.

"Beyond doubt, my friend—but worth it. Once the atmosphere has been created the biggest obstacle of all has been overcome—— You are frowning, Konsicks! Why?"

The astronomer shrugged. "Somehow—I expect I'm an old fool!—I've got an idea that we're dabbling in things just a bit too big for us! Beating nature at her own game, so to speak. It doesn't do, Mayro! It never worked out yet!"

"A childish superstition, my dear friend," Mayro answered smilingly. "You will see! Once the atmosphere is made, the black sky of the Moon will banish and we shall have a blue one. The heat and cold will be tempered. We can create clouds to prevent the blazing Sunlight—— Yes, we can cultivate a perfect little world here. And now to business. We have no time to lose."

"What when night comes?" Vane asked.

"When that happens work will continue on the daylight side—the side always turned from the Earth. We shall follow the Sun."

Mayro turned aside and passed into the space-suit compartment. Twenty minutes later the entire party was outside on the rocky floor, gazing about them at the towering pinnacles of Tycho's crater through their smoked eyeglasses, glancing at times at the remarkable spectacle of the Sun and star-bedridden sky and softly green "new" Earth.

Then attention swung to the remainder of the party, headed by Ramsey the mathematician, who were rapidly appearing from their various ships, on both sides of the chasm from which Mayro and his comrades had originally emerged. The others advanced slowly, their great boots weighing them down so that the lesser gravitation could play no capricious tricks.

By means of helmet 'phones, Mayro made the whole sequence of plans perfectly clear, and so there began, at the high noon of that month-long day, the most amazing task ever attempted by man——

ON EARTH progress was watched through gigantic reflectors, and relayed by television to a waiting world. Months passed, and steadily there began to appear on the Moon's face the bristling spikes of towers at regular intervals. The various craters and dead seas of the Moon were littered with all manner of remarkable materials and superengineering devices. And, on the other side of the satellite, hidden from Earthly eyes, similar activity was taking place—for it proved to be entirely similar to the Earthward side, and not the harborer of some strange and fantastic civilization, as Vane had silently hoped.

Thrice trips were made to Earth for further supplies. A year passed—two years—three years. Then came a change.

From the Earth, one September night in 1976, the Moon was seen to slowly change from an argent-faced globe into a satellite of writhing mists that boiled and swirled mysteriously over the entire face of that world. Every telescope and refractor was trained upon it. Across the Earth flashed the news. The Moon had an atmosphere!

And indeed it had. Through eight long months, ever since the towers had been completed, there had been pouring into the vacuum about the Moon a constant and enormous supply of oxygen and nitrogen, held to the Moon's surface when in small quantities by electromagnets, specially devised for the purpose, until finally there was enough to spread round the entire globe. Then, following natural law, the gases adjusted themselves so that when they reached a given height the density corresponded to the quantity of air above that height, this height acting as a weight pressing upon the air, and compressing its elastic substance until it had a density proportional to the pressure so produced.

So was the first stage reached. The pioneers of the Moon discarded their stuffy space suits and stepped out into a new world—a world with a sky of clouds, sheltered from the blazing rays of the Sun. Work began with disintegrators and the leveling of the enormous mountain ranges and crater walls began.

It was grueling, relentless work, yet in the main the pioneers took pleasure in it. Vane and his wife set the example to other men and their wives, and as a consequence the soft-muscled astronomer and his sensitive wife changed into hard-bitten, tough adventurers, as strong as the rocks they destroyed, and as happy as the month-long day lasted.

Strange it was, too, how Earthlings found themselves working all through the month of daylight and sleeping a month of night. Conditions, the effect of time, the somewhat lighter air—having a pressure of ten pounds to the square inch against Earth's fourteen—aided speed and activity. The gravitation had at first been the biggest difficulty, but experience had overcome its tricks. It was the lesser gravitation, too, that made the destruction of mammoth mountain ranges remarkably simple, with a sixth of terrestrial resistance.

It was during this progress on the new world that Mayro made a radio announcement of paramount importance to the colonizers. He had discovered his long-sought-for secret of releasing atomic force! It appeared that experiments with a disintegrator had led him into the fields of copper-particle emanation, finally resulting in producing from a copper bar, some two inches long and half an inch thick, a source of stupendous power, which at will could be used as either a superblasting machine or else inconceivably powerful magnetizing machine. The instant his discovery was made he went further and finally produced the Mayro Dredger—a prosaic name for a mighty discovery.

This apparatus, by a single frightful blast from its copper resources, completely destroyed an entire mountain range near by. Not only that! The atomic force activity, reversed in action, drew the colossal boulders and stones in the debris to the encampment with tremendous speed, purely by magnetism, and deposited them there for building purposes——

So appeared another landmark in lunar history. From then on it was decided that the Dredger could do the work of thousands of men, and accordingly, a tower, larger than all the others, and composed of that remarkable radiation metal, was erected to a height of six hundred feet, with sheer unbreakable walls, possessing no visible doors, and supplied at the summit with a large-scale Dredger that could wield its power over an enormous area of the still hardly scratched lunar surface.

Mayro was immensely enthusiastic over his discovery—so enthusiastic indeed that he failed to realize that in his discovery he had unwittingly laid the seed of discontent among Earth's strange and many-sided peoples. Where formerly men and women had toiled happily day by day, entirely thoughtless of any desire for anything else, they were now suddenly almost useless quantities—replaced by a flashing mammoth-force engine that leveled plains and removed mountains without visible effort.

It even drew the heat of the Sun to itself if left in action too long, and this fact caused the walls of the tower, being absorptive, to store up the heat and convert it into energy—hence, after a spell of considerable usage, the mighty tower would glow with radiations similar to those of the space ships, and, when the negative current was removed for any purpose, the structure became a literal blaring mass, eliminating both the heat of the Sun and that of its own natural radiation.

The colonists began to distrust the idea, wondered what was behind it all. So far everything had been all right, but now—— Here and there unexpected dissenters sprang up and began to demand of the populace why they should strive and struggle on this hell satellite when Earth itself was perfectly comfortable? Why shouldn't they go back to their native world and leave the maniacs from the cosmos to themselves? Who had started this fool idea to colonize a dead world, anyhow?

Dr. Koesicks saw the position clearly, and toward the end of one of the long lunar days, before retirement was to be made for the equally long night, he made the position understandable to Mayro and his comrades. Vane and Evelyn were present, too, listening in silent attention.

"Mayro, you don't seem even now to have thoroughly determined what idiots human beings can be at times!" Koesicks said grimly, his eyes bright behind his glasses. "The people here are thoroughly dissatisfied. For some reason not altogether clear, many have popped up like magic, men and women, and spread a desire for revolt. I understood all the men and women were sound, honorable people, but now—— Well, I begin to wonder."

"Do you mean you think there may be some men and women belonging to Rawson among them?" Vane asked quickly.

"Yes—just that," Koesicks assented gravely. "There was nothing to prevent Rawson's spies joining up as volunteers, of course—but I hardly thought they would do so. I thought they lacked both the nerve and the opportunity. It seems that I was wrong, and that they have seized the first chance to stir up trouble; when we were all working there was no sign of trouble. Plausible tongues can do a lot of damage, Mayro, particularly when backed by such a thing as your Dredger—— I still feel no good will come out of this effort to colonize a dead world; just as I said before."

Mayro spread his hands. "I never for an instant thought Earthlings could be so basely ungrateful!" he said sorrowfully.

The doctor shrugged. "There is always a certain element like that. It can't be avoided, I'm afraid."

"Then what do you suggest I do? Destroy the Dredger?"

"No; it is too valuable. We can only watch, and when the day comes again we will be on the alert. We'll consider giving the people back their work and using the Dredger for other purposes. It's the only way. Nobody can damage the Dredger, can they? If they did tamper with it, it could cause appalling damage in unexperienced hands——"

"You need not fear that, my friend," Mayro returned with utmost confidence. "That tower, as you know, is composed of indestructible metal, and has a secret

door in the summit for egress only. The only way to enter the tower is via the hyperspace machine at the base camp, and nobody knows anything about that save ourselves, my five companions, and Ramsey, our mathematician. Frankly, I feel that you worry needlessly. Nothing will happen."

Konsicks nodded slowly. "Maybe you're right, Mayro, but you see I happen to know how strangely Earthlings behave at times. They will, if forced to it, destroy even their own mothers if they see an advantage in it. They are still—many of them—little better than the brute. However, I'm worrying no more now; I want some sleep. Coming, Vane? Evelyn?"

The two nodded and bidding the giant good night left the control chamber of the ship, which he and his companions, as a rule, continued to occupy.

V.

THE NIGHT passed quietly enough, blanketed in by its new atmosphere, but toward its close strange movements became afoot among certain of the colonizers.

A party of six men moved with cautious footsteps across the rocky ground toward the silent base camp, as the main authoritative building was called. As was customary, a tireless colleague of Mayro's was on guard, watching over the various machinery upon which relied the advancement of the newborn Moon's civilization.

"Right!" the leader of the party whispered presently, in a low voice. "Now's the time! We're lucky it isn't Mayro himself. Come on!"

With one accord, they smashed through the immense window with a heavy boulder, and walked through the opening—it being at ground level. The leader of the party leveled his rock disintegrator as Zanos, Mayro's closest friend, swung round in amazement.

"Make one move and you'll find yourself pure dust!" the leader growled. "O. K., boys—go to it. Tie him up."

The others made to follow the order, but Zanos suddenly sprang to life, his red eyes flaming. The machines were in danger, and that was all that concerned him. With one mighty bound of his enormous legs he strode across to the leader—then stopped as he saw the button on the disintegrator depress——

There was no sound. Only a vivid flash of carmine light and gusts of scorching air. In one single instant of time, Zanos, seven feet eight of muscle and power, vanished utterly, reduced to the finest dust floating up to the single sub-radium lamp in the ceiling.

"You idiot, Jim!" breathed one of the party. "You shouldn't have done that! Mayro will tear the life out of you when he finds out!"

"He won't find out," the leader returned calmly. "Get busy with that hyperspace machine, Ramsey. You've spent long enough on its details to know how it works."

Ramsey, the mathematician, nodded slowly.

"Everything's worked out, Mr. Rawson," he answered quietly. "Here is the machine. The power switches on here." He pressed a button on the metal wall, and a series of rotating bars commenced to move up and down, at the same time emitting a bluish-white light upon a clear space beneath the machine's superstructure. "The number for the Dredger Tower is 4685. That will materialize you inside the tower. I've been with Mayro enough times, so I ought to know."

Rawson smiled with grim significance. "Great to have a guy like you, who's always by Mayro's side," he commented reflectively. "I don't like leaving you behind, all the same. You might spill something."

"If I'm not left behind Mayro will look for me," was Ramsey's cold answer. "Come on—let's get busy. You first, Morgan."

"I don't half like it——" Morgan began—but a fierce shove hurled him into the area of the blue light. The mathematician moved a massive pointer on the side of the instrument, swinging it round to the number 4685, then depressed the releasing button. In an instant Morgan vanished from view in a haze of swirling light.

"Seems all right," James Rawson commented presently. "Come on, Martin, get busy! And on second thought, Ramsey, since you're staying behind, you'd better wreck this hyperspace machine. That will stop any attack on us within the Tower if you choose to tell Mayro of our plans."

"You know how to get out of the Tower?" Ramsey asked indifferently.

"Sure! You told me all about the door at the top and the staircase—the metal that falls apart and can only be opened from inside. I know. So long as nobody gets in I'm not worried about getting out."

"Suppose I don't destroy this hyperspace machine?"

Rawson grinned unpleasantly. "You will, if you've any sense—else explain how it was that we got in the Tower. Remember you're the only outsider who knows how to work this darned thing——" He paused significantly. "You'll destroy it all right!"

With that he turned into the machine's area, and, one by one, the remaining men vanished from view. Ramsey, after the last man had gone stood in thoughtful silence for a space, then he shrugged his shoulders, pulled out his disintegrator, and leveled it at the exquisite machinery. Two carmine flashes and the machine was in irreparable ruins.

Ramsey passed it a final glance, nodded slowly, and then vanished into the slowly approaching lunar dawn outside, thinking mainly of the five men in the Dredger Tower, and wondering if they knew enough about the Dredger itself to control it from the detailed instructions he had given them——

NORTON VANE was literally shot out of slumber by the shaking of a violent hand. Opening his eyes sleepily he beheld the massive figure of Mayro himself by the side of the bunk, his usually calm, impassive face troubled, for perhaps the first time since his appearance in Earthly history.

"Quick! Quick! An astounding thing has happened!" he gasped out. "It threatens the entire solar system. I've awakened Konsicks. Get your wife and come to the control-room chamber on my ship right away!"

"All right," Vane replied drowsily. Fifteen minutes later, still half asleep, he and Evelyn reached the visitors' space ship, to find Mayro within, his grim-faced companions—only four of them this time—and a serious-eyed Dr. Konsicks.

"Well?" Vane asked interestedly. "What's the matter?"

"Do you notice anything peculiar about the daylight?" Mayro demanded presently.

Vane looked about him, then nodded in faint surprise. "Now that you mention it—yes. It seems sort of—well, a trifle reddish. Like a winter Sun on Earth."

"Vane, Dr. Konsick's warning came too late," Mayro returned grimly. "During the night some unknown men have destroyed the hyperspace machine, and my dear friend Zanos, and have placed themselves in the Dredger Tower. Televised light waves have revealed that to me. They are using the atomic-force machine to their own advantage, but what it is I can't yet conceive. For some reason they are absorbing heat from the Sun! And, with such appalling power

at their command, the Sun is fast *cooling!*"

"Good Lord!" Vane gasped blankly, and Evelyn uttered a little cry of dismay.

"You are sure you can't get into the Tower?" Komsicks asked keenly.

"Only too sure," Mayro answered, compressing his powerful lips. "The only way was by hyperspace, and as the machine for that is destroyed, it's useless. I was going to enter the Tower this morning, as is my usual custom, and I discovered the ruin I have mentioned. That means somebody among us knows who destroyed the hyperspace machine. It's one of us in here—or Ramsey, our mathematical expert—— But never mind that for the moment. We will see what the infernal creatures are doing."

Turning, he hastily switched on an instrument by his side, already attuned to the Tower, and there appeared on the screen on the ship's wall a reproduction of the incidents taking place within the Tower itself, the televised system being capable, in the same manner as radio waves, of penetrating solids. Nor was a transmitter necessary. Trapping light waves from inside a solid was an elementary art to the visitors from the cosmos.

"What are they playing at?" demanded Vane in puzzlement, as he silently watched five men struggling desperately with switches and coils, and pointing ever and again to the mighty, glowing copper power plant which provided the power for the atomic force. Once, two of them rushed to the solid wall, beat impotently against it, and then fell back, to return with tottering footsteps to the power plant. It seemed that the very walls were shining.

"By heaven, don't you see who it is?" shouted Komsicks suddenly, pointing. "Look! It's the——"

"It's the man who knocked Evelyn down, and was afterward hammered by you, Mayro—when you arrived in Yuma Desert!" Vane rattled out. "Can he be Rawson, do you think? Or is he just an ally of his? Surely he's too unintelligent by himself——"

"Obviously he's unintelligent!" Mayro snapped out, consumed with fury. "Instead of using that atomic-force machinery for power, which probably was his original intention, he's got the reverse action and is using the magnetism effect. The result is that he is drawing the heat of the Sun constantly, in such vast quantities that before very long, unless we stop the maniac, the Sun itself will expire! The fool! The consummate idiot! Anybody with the vaguest knowledge of scientific machinery could control it. I wonder who put him up to this——"

"Mayro, may I speak to you?" asked a voice suddenly, and the giant swung round from his instrument to behold the slight figure of Ramsey in the control chamber.

"Well, Ramsey, what do you want?"

"Merely to tell you that I am mainly responsible for all this. Rawson's plans have gone wrong; he'll never escape that Tower alive—— You see, I've been in Rawson's employ all along. Without me he was useless—he had neither brains nor science in his make-up. And, of course, being in close touch with you as well, it made his plans for your downfall singularly simple."

"What in the devil's name are you getting at?" demanded Vane savagely. "Come on, you lying scoundrel! Let's have it!" He shook the man with his powerful arms, until Mayro's compelling hand stopped him.

"Let me handle this, Vane—— Now, Ramsey—the story! And quick!"

"There's not much to it," the mathematician answered slowly. "I killed a man once—it was an accident—but Rawson heard of it and threatened to hand me to the law if I didn't help him with my mathematical knowledge. You had arrived on Earth, then, Mayro, and I was already in your employ. I saw

no harm in doing what Rawson asked. He's coarse and uncouth; all the finer details have been my doing. As fast as I've learned anything I've passed it on to Rawson—and it was I who started the rebellion idea on the Moon here; I stirred up trouble with the people, using Rawson's agents for the purpose. Of course, it was easy for him to get to the Moon here by a simple disguise; I took care of the details.

"Rawson hates you, Mayro—has hated you ever since that day in the desert when you broke his jaw. His only desire ever since has been to destroy you and your works, and, being something of a power in the criminal world of Earth, he's done quite well, with me to help him. His chance here came when you discovered your Dredger. He decided, with the information I'd given him, to use the Dredger as a force machine and radiate your ship and all your works out of existence—then allow Earthlings to return to Earth. Nothing more than that. Not world power, or anything so fantastic. Purely a blind hatred for you. With your destruction and the return of everybody to Earth, he would have been satisfied. To destroy Earthman's faith in you was in the first move; to destroy you the second, and to return to Earth the third."

"And you know what has happened?" Mayro asked in a measured, relentless voice.

"Yes." Ramsey considered for a moment; then lightly, "It's rather a pity, really."

"Pity!" Vane exploded furiously. "Why, you damnable, callous——"

"With their clumsy blunderings they have switched on magnetic force instead of the disruptive," interposed Mayro, in the same merciless voice. "They can't stop the machinery, and neither can anybody else! They're trapped in the building and don't know the way out."

"I explained it to them," Ramsey replied calmly. "If they can't find it, it's their own fault." He glanced at the screen and raised his eyebrows. "Hm-m-m, they do seem to be having slight difficulty, don't they?"

All five men were on the floor now, only moving occasionally. The walls were gleaming even brighter, and the copper in the power plant shone brilliant green.

"The door in that Tower opens, as you know, Ramsey, by sound vibration," Mayro remarked grimly. "Did you know when you sent them there that they couldn't possibly duplicate those sounds without the instruments for the purpose? Such as we carry?"

"I wonder if I did?" the mathematician asked enigmatically. "I do know, though, that I expected them to be successful and not make such idiots of themselves. You see, I expected them to switch on the power for disruptive force, but before it could do any damage here the recoiling power alone would have crushed the life out of them. They couldn't find the way out without the sound machine for opening the door—— Dear me—really a bad mistake! They managed to switch on the power all right—but got magnetism by mistake —— My dream of dispatching Rawson in a spectacular way has been shattered, indeed."

"You planned their destruction quite skillfully," remarked Mayro presently, his voice still with that inflexible intonation in its depths, "but at heart, Ramsey, you are as big a devil as they. All my work here—everything—has been ruined. That is bad enough, but by all the gods I can never forget that your meddling resulted in the death of my beloved comrade, Zanos. You have a price to pay, Ramsey."

The mathematician started at that and shot a glance of dismay at the relentless red eyes fixed upon him. His nonchalant manner vanished in a trice.

"You don't mean you would kill me?"

he gasped out. "I didn't kill Zands! I was all against it!"

"He was killed as the result of your underhand methods, and that suffices," Mayro replied coldly. "I am sorry—but you have reason to know that we are a just but unsentimental people. Good-by, friend Ramsey."

The mathematician swung round at that and made desperately for the door—but before he had got halfway a carmine beam followed him. Came one horrible shout, then a thin blue smoke was drifting through the control-room door into the red sunlight outside—— Ramsey, mathematician and traitor to a mighty cause, had ceased to be.

Mayro slipped his instrument back in his belt and looked round for a space at the silent, faintly horrified faces of the Earthlings. Then with a shrug he looked back at the screen on the wall.

"The heat is killing them," he remarked presently. "As time passes the heat will get worse. Every vestige of heat in the Sun is being drawn relentlessly by that power plant, passing into the absorbative, radio-active walls of the Tower itself. The end is inevitable ——" He stopped and turned. "We have no alternative, my friends, but to leave as quickly as possible! We must leave the Moon and return to Earth; warn Earth's peoples what is happening. They must take all precautions for a period of terrible cold owing to the withdrawal of the Sun's heat. In two weeks, and that is the life of the copper in the plant, the Sun will be burned out, every vestige of its heat energy trapped within that Tower—to what end we cannot even guess, as yet."

"But surely we can get in the Tower—*do something!*" Vane demanded desperately; but Mayro shook his massive head.

"No, friend Vane. I know from experience that that Tower is impregnable. You were right, Komicks. To try and colonize this world was going against the law of nature—we have failed! Once back on Earth we must turn our activities to determining how to create—if possible—another Sun. Come, Komicks, we must raise the alarm."

ONCE the situation was made clear to the astonished Earthlings, the exodus from the Moon began at breakneck speed. The power tower was already commencing to glow on the outside and emitted an appalling, scorching heat over a distance of five miles. Once or twice Vane tried to guess at what would ultimately happen, but without success. The only conclusion he could arrive at was that the Tower would finally burst asunder——

Yet, how could this be? The metal was indestructible, and incapable of bursting or melting. Its sole purpose was that of storing and retaining energy, and such a mass as the power tower was capable of storing even the entire energy of Sirius itself without coming to any harm, let alone the tiny Sun of the Earthly solar system.

Vane gave up the problem finally, and five hours later the entire fleet of pioneers, disgruntled at failure, were in space heading toward Earth, leaving behind them that still-operative copper plant, and the five dead men beside it who had so successfully ruined the attempt to colonize Earth's satellite, to meet their deaths in that very selfish endeavor. Poetic justice—but certainly no consolation——

Back on Earth the news was publicly broadcast, of course, from the controlling edifice in the sky which Mayro promptly took over on his return. Orders were given for the immediate preparation of heat machines in every available quarter of the Earth to stave off the appalling cold and darkness that was to come.

And so, through fourteen frenzied days, mankind toiled and struggled in a fast-waning daylight and pitch-dark

nights to erect all manner of devious heat machines, from ordinary steam radiators to electric and subradium arcs. Mayro, tireless, brooded over all this activity with knitted brows, and, on the thirteenth evening, watched a red, almost extinct Sun sinking below the western horizon, the amazing sky city etched out in a silhouette of ink before it. Of Moon there was no sign, of course, owing to the Sun's failure to provide light. The only trace of the satellite that remained was a faint radioactive glow in the heavens, occasioned by the power tower itself.

"There we see the last of the Sun," Mayro commented grimly. "For thirteen days the lunar power plant has been drawing its heat energy at an inconceivable speed, and by to-morrow morning—and there will be no daylight!—our Sun will be a dead star. Burned out—as though there had been some colossal short circuit in the void! I cannot even now understand why all that energy doesn't react in some way—its stupendous power and force. Let me think—— Something has got to be done to provide Earth with light and heat again. Leave me, Vane—you, too, Konsicks. I must think this out."

"Very will," answered Konsicks, and the two left the meditative Mayro to grapple with the gigantic problem alone and——

It was in the light of an arc lamp that he reappeared to Vane, Evelyn and Konsicks, the three of them slumped on chairs in an anteroom, fast asleep. Quietly he woke them.

"I have it," he said very gravely. "The cause and the cure! It is now high noon, but the Sun has not appeared; its extinguishment is complete. But, that energy has all gone into the walls of the power tower on the Moon. Knowing the peculiarities of that metal, I realize that the reason for the energy being dormant is because there is no friction to cause it to be released. It is simply there—a tremendous mass of energy, waiting—for friction."

"Friction?" repeated Konsicks, sitting up.

"Yes. Don't you understand, knowing metal, that that energy is at a uniform level? It has passed into the power plant, into the absorptive walls of the power tower, into the very ground of the Moon itself. Atomic force, my friends, is mingled with it, but, as our experiments have proved, atomic force cannot be liberated without friction to commence the disintegration. Friction—that molecular disruption action—commences the entire process which afterwards goes on indefinitely."

"Yes, but what——" Vane began.

"Just this, friend Vane. The Earth shall have another Sun! It has lost the energy of one, but that energy has passed into another body—the Moon. Friction will be generated on the Moon, strong enough to start the relatively infinitesimal spark that will set atomic force spreading all over the Moon's surface. You understand? A hurtling flight into the very midst of the power tower itself, creating a band of fire through the atmosphere we have created—frozen now, I expect—and then—— Fire! *Atomic* fire! Which will instantly kindle itself and become liberated energy. Flame and heat. Will finally turn the Moon into a blazing Sun, with an indefinite life of tens of thousands of years, until every atom and molecule has been exploded and destroyed."

"But, Mayro, who on Earth is going to do such a thing?" Evelyn asked wonderingly. "To do that will mean complete annihilation!"

Mayro shrugged, a strange light in his red eyes. "In the beginning, it was my friends and I that started all this trouble," he said slowly. "We have consulted each other, and we are agreed that we have no real place on Earth. Through us, indirectly, the Sun has been burned out; it is only just that it be

us who restore it. You have gained something from the cities and inventions we have given you, perhaps, but now our work is indeed at an end. You remember I once said I wondered what would happen when our work was ended. Now you know. My comrades and I are of one mind in that the Moon shall again be our mausoleum—perhaps more than that. A colossal crematorium, in which we shall instantly perish. What does it matter? Our work is ended, and on Earth we are no longer needed—or probably even wanted. Better release our minds from these cumbersome bodies——"

"So, for the sake of saving a world you are prepared to sacrifice yourselves?" Konsicks asked in a low voice, after a long pause. "After the benefits you have bestowed, too! We cannot allow you to do it, Mayro! We'd never forgive ourselves."

"My dear friend, be reasonable!" Mayro replied. "Earthlings to-day are facing a world which is dark and Sunless. True, they can exist by the various heating devices that have been erected, for quite some little time—but there is bound to be a quick ending to it all. Earth will freeze—the atmosphere will solidify. No man-made heating devices can take the place of the all-powerful Sun. Science is not so far ahead as that."

"But, Mayro, cannot a projectile be fired at the Moon from here?" Evelyn asked.

"How, dear lady?" the giant inquired gravely. "Just how? A projectile could never be satisfactorily guided through 240,000 miles of space to impinge dead on that power tower. Besides, the Moon's surface is dark owing to the Sun's failure. Not until we get really close to it, near enough to see the radiations of the power tower, can we find the correct vantage point. No, a personally driven space ship is the only way. Please do not worry about us, my friends," he went on earnestly. "My companions and I are not afraid of death; it is purely a new scientific experience—— We depart in an hour."

And with that Mayro thoughtfully left the chamber, leaving the Earthlings gazing after him in silent admiration. That such nobility of purpose could ever have come out of the cosmos was something new to them, and inwardly they reproached themselves for ever once having dared to think that the visitors might be hostile.

Hostile! Where was there an Earthling who would make such a sacrifice for another world?

BY THE special request of Mayro the population of New York II was not informed of his decision. There was no need for Earthlings to leave their heated fortresses in order to demonstrate praise and good will. Such was the matter-of-fact way in which Mayro and his comrades surveyed the matter. And indeed they certainly did not appear at all perturbed at the merciless task they had allotted to themselves.

Konsicks, Vane and Evelyn, wrapped to the ears in furs, were the only ones who accompanied the visitors through the dark Sunless silences of the sky city's ground levels to the space grounds. The air was relentlessly cold; the thermometers revealed 20-below freezing, and falling steadily every minute. It came to the Earthlings in a passing thought how futile were all the efforts of man compared to those of celestial power——

Quietly, Mayro singled out his own space ship and stood aside for his companions to enter the warm interior. Lights came up in the control chamber. For a moment he stood in the man-hole aperture, silhouetted against the light from within.

"Good-by, my friends," he said gravely. "It has been an interesting period, and we have left you a world

worth having. You are hundreds of years ahead of what you would have been normally. As Konsicks once said—it is a mistake to try and colocate a world which the fates have deemed extinct. In approximately eight hours, for we shall waste no time, the dead Moon will kindle into life as we strike the control tower. You will have a very-near Sun, but on account of its infinitely smaller size compared to the dead Sun you should experience no discomfort. Farewell my friends."

"Good-by, Mayro," replied the three, almost in one voice, and Vane cursed himself for a sentimental idiot when he found his eyes were suddenly, strangely wet. He turned to find Evelyn openly and unashamedly crying.

The space-ship door closed. Came a short interval in which the silence seemed more oppressive—then with utter noiselessness the ship suddenly lifted from the ground and shot into the blackness. A faint streak from its electrical radiations, mounting ever higher—then it was gone. Three Earthlings were left, staring into the star-sprinkled vault above.

For quite a time they remained thus, then, the biting cold creeping into their bones, they turned and walked slowly back to the controlling edifice, operated the immense elevator that took them to the summit, and returned to the warmth and light of the main chamber.

Almost without a word they seated themselves at the immense window, switching off the light that they might have a better view.

"Eight hours," murmured Konsicks presently, glancing at his watch. "That means that at approximately eight o'clock to-night we shall see the Moon—entirely invisible at first, of course—kindled into life, if the gallant Mayro and his comrades are fully successful. If not—Earth is doomed."

Vane and his wife said nothing. They sat huddled together, staring over the dark and slowly freezing immensity outside, wondering how other Earthlings were faring in the deadening cold—or else pondering upon the mind motivating the selfless being known as Mayro somewhere in the depths of space, deliberately driving a space ship to destruction and incontinent doom to himself and companions——

The hours passed. The darkness remained unmitigated. The stars shifted slightly with the passage of hours. It was strange to notice the absence of the planets, Mars, Venus and Jupiter. Owing to the Sun's failure these worlds, too, must have suddenly experienced sudden and complete iciness—nor would the kindling of the Moon be of any use to them, being both too small and too distant. The life of Mars and Venus, if any, had been snuffed out for eternity. The whole cosmic order of things had changed unbelievably—all because one man, the deceased James Rawson, had nursed a grievance!

The three partook of perfunctory meals and then returned to the window to watch. Twice during the "day" they received messages from Crespin, who was with his immediate officials in the astronomical edifice seven miles away. Only to him did Konsicks reveal the visitors' sacrifice. Then, waiting again. Until at length the time began to draw to a close. It was almost 8 p. m.——

In their minds' eye the three could picture what was happening. And their imagination was very close to actual truth.

Sweeping, even at that moment, down toward the frozen desolations of the Moon, in which was imprisoned the inactive energy of the Sun and unprogressive atomic force, was Mayro's space ship. An omnipotent observer might have seen it for an instant as a blazing silver streak, hurtling through the Moon's now semifrozen air with undiminished speed. During the journey through space it had reached a pace of

approximately 98,000 miles a second—half that of light; a speed which had been gradually attained, taking eight hours in all to accomplish—but now, as Mayro swung round the ship's nose toward the faintly glowing mass of the silent power tower, he made no effort to decelerate. His jaw merely set a little tighter; his comrades waited patiently at their posts.

Faster—faster—— The power tower's mass hurtled upward with inconceivable speed until——

The space ship crashed dead in the center! In an instant it was reduced to blazing flame by the appalling collision. In one split second Mayro and his companions were literally rubbed out—became cosmic dust. A mighty mass of boiling, livid green and white flames spewed outward from the Moon's surface, expanding such enormous energy and heat that in another second the Moon's surface itself caught fire. Without a second's pause the atmosphere followed suit, the atomic energy releasing itself, which in turn released the stored-up energies that had been drawn from the Sun. As though some stupendous match had been applied to an inexhaustible supply of gas.

Mightier and mightier became the conflagration—a mixture of atomic and solar fire. The energy of the Moon's mass itself began presently to disrupt and flame—and would continue to do so through tens of thousands of years until at length every scrap of atomic power had been destroyed——

ON EARTH, Vane, Evelyn and Konsicks started into life as they suddenly beheld low down on the eastern horizon, where the Moon should have been rising, a mass of green and white flame. Crespin and his men saw it also at the same instant, and became stricken with amazement at the sight.

Climbing gradually into the heavens, the Earth turned on her axis and the Moon also shifted its position, came that flaring ball, already a mass of searing flame, pouring heat down on the frozen Earth. The sky began to take on blueness.

"He made it!" yelled Vane, jumping up and down. "Lord bless Mayro! He did it!"

"Don't go outside until things warm up a bit," counseled Konsicks, as mature as ever, his thick glasses gleaming in the light.

So, gradually, the entire mass of the Moon became incandescent, became a literal Sun at a distance, on an average, of 240,000 miles. As she swung nearer there came a summer season, and as she moved away, came a winter. Later, experience proved this fact.

Within a week Earthlings emerged into the open to take stock of their surroundings. Save for extreme cloudbursts when the warmth had returned, and three tidal waves caused by the cosmic shiftings, Earth was little the worse off—and from then onward the weather-controlling machines kept the climate normal the world over.

The only changes that would be noticeable would be in years to come, for, as the Moon's bulk was transformed slowly into pure gas, her mass would consequently lessen until she became a globe of heat. This would cause the Earth to shift its position owing to the altered gravitative pull, but so slight would be the movement, and so gradual its accomplishment, scientists did not consider the matter of vital concern.

At first difficulties were experienced by Sunrise being varied in its arrivals, but at length an arbitrarily fixed Sunrise and Sunset of twenty minutes later each time was arrived at, and Earthlings slowly adapted themselves to the change. The tides too, underwent several changes owing to the gravitational alterations, and new coast lines were made while others disappeared——

The visitors from the cosmos had

come—and gone. They had left behind them a world of enormous progress and speed, wherein the vast majority was happy and contented. A world of curious sky cities, hurtling conveyances, and a perfect understanding of space travel.

A Sun had been destroyed, and another reborn—and many were the times that Vane and his wife would glance up at the flaming mass, or study it from the Californian observatory, left untouched at Konsicks' request, and think of the giants who had come from within that ice-bound mausoleum, to transform it finally into their celestial funeral pyre.

A new sun was born as men gazed upward, unbelieving.

The Einstein Express

Concluding the concept of titanic guiding intelligence

by J. George Frederick

UP TO NOW:

Arthur Woodlock, a young scientist, was so absorbed in the discovery that he and his partner, Gregory Slocum, had made that his fiancée, Amelia Carr, broke off their engagement. Woodlock told her that he had given his life to science and was a doomed man so far as his personal life was concerned. He resigned her to his rival, Ackerman, who had been trying to win her.

Woodlock went to an old airdrome at Springfield, when Slocum phoned from Chicago that he was bringing Professors Peck and Mitchell there for a demonstration of the great discovery. Terry, an old watchman, had charge of the hanger which housed "Big Bertha," as they had named the most powerful and advanced piece of "atomic artillery" so far constructed for bombarding atoms.

It consisted of two huge cylindrical pillars on a heavy steel base, each cylinder topped at a height of thirty feet by a great hollow aluminum sphere, twenty feet in diameter, one positive, the other negative, and each elaborately fitted with instruments. In these Woodlock and Slocum sometimes stayed for forty-eight hours at a time, busy at their work, hardly taking time to eat.

On the arrival of Slocum with the two professors, Woodlock took them up to the positive sphere. Here he explained the discovery he and his partner had made. They could generate a combined electrical pressure from the positive and negative terminals of over 16,000,000 volts. Gregory, in the negative sphere, listened to the conversation over the short-wave radio set. The professors had known before of the bombardment of various targets in the vacuum tube, producing new types of synthetic atoms and X rays; now they were told they would see matter disintegrated and transformed into light, and then, by means of a key matrix, reintegrated into its original form. This they could do even with a living organism.

Demonstrations followed, the last being with a dog which they called "Dog Star"; he had made ten journeys into space and had been brought back by the key matrix, and once more he made the trip successfully. It followed that human beings might be shot out into space in the form of light and reassembled, without having aged, a hundred thousand years later. As Mitchell expressed it: "It means triumph over time, over matter. It is an Einstein express to eternity."

For days, thereafter, other great scientists were in session with them, and at last the newspapers got hold of the facts. The publicity proved likely to be injurious, many contending that such dangerous experiments should be stopped. Woodlock, therefore, decided not to wait. Amelia, repentant for her-

It was like an infinite intelligence that could hold a universe in the hollow of one hand.

ing given him up, had come to see him and to her he announced that he was going to travel to the stars himself. She begged to be taken with him, Slocum agreed to go, too.

After a futile attempt by Ackerman to abduct Amelia, she and Woodlock were married by Terry, who was a Justice of the Peace and in the positive sphere the two spent their wedding night. Woodlock had left minute instructions to Professor Peck as to how to bring them back and had explained to Terry the simple things he had to do to send them off into space.

All night long the generators lifted more and more voltage into the positive and negative spheres. At four o'clock, the three human beings crowded into the thick glass compartment. Then, at four thirty, a leaping consuming cold flame, 16,000,000 volts strong, was upon them. The die was cast. The Einstein express was making its initial trip. How would the passengers feel? What would they encounter? Or was all to be black extinction?

IX.

WITH something of a click, and certainly with far more than the speed of an electric switch flooding a dark room with brilliant light, Woodlock, Amelia, and Slocum found their consciousness after the brief sensation of unconsciousness upon being radiated into space by Big Bertha.

But with what an almost inconceivable difference!

There was no sense of physical presence. There was nothing to hear, feel, see, taste, smell, or touch. There was no possibility of any sensation of organic motion; no hands or feet to move, head to turn, muscles to stretch.

The nearest resemblance to any earthly experience was that of a dream-state, in which one lies inert; no sense and no muscle active, only a state of feeling and of mental and spiritual activity.

Most thrilling and important of all was the sense of communication. Woodlock, Amelia, and Slocum felt with full reality each other's nearness, each other's feelings and thoughts; each other's common interest, common attraction which held them attached; the "nucleus" around which they revolved in a very definite sense.

It was as if their bodies had gone through a vast but sudden distillation process, and only their essence was left; and as if this was now expressed in the primordial form of an atom. And, uniquely, that essence seemed to include quite everything important. What had been sloughed off seemed rather amazingly of no real consequence; perhaps even an encumbrance.

"Art," Amelia's voice seemed to say in beautifully modulated accents, except that, of course, there was no voice in the earthly acoustic sense, "Art, it is so exhilarating, so glorious, yet so peaceful, isn't it? I seem to be reaching out my hand to you to touch, and you are touching it—and yet there is no hand. If I stop to reason about it, I become a little panicky, but——"

"Don't reason about it, darling," Woodlock's voice seem to say—and from this point forth in this narrative, we shall assume that the interchange of thought and feeling took the concrete form of conversation, as on earth. "I will explain many of these things to you, because we have nothing whatsoever to do but think and feel. Greg, old boy, you are right here with us, aren't you?"

"With cosmic bells on," replied Slocum, in charmingly familiar shades of the relation of deep loyalty, comradliness, friendship—with even his quiet sense of humor intact.

"Good! Good!" Woodlock exclaimed with magnificent elation. "The first great success has come to us in

a far more perfect degree than I ever thought possible. We are on our way!"

"On our way, where?" came from Greg, with his old familiar earthliness.

"Why worry about that?" rejoined Woodlock.

"Oh, why didn't we take Dog Star with us?" exclaimed Amelia suddenly.

"Brilliant idea—but too late," Gregory commented. "Good old Dog Star! He has passed along this way many times, eh, what, Art?"

"But never again," replied Woodlock. "I don't think I had time to tell you that I left a note offering him to the Smithsonian Institution. He may become a historic dog."

"What a pity he isn't with us," gayly remarked Gregory; "we could have taken him off on a shooting-star jaunt. He was a good hunting dog once."

"I knew you could be flippant, even as a disembodied spirit," said Woodlock.

"All right, sobersides," Gregory flashed back. "Suppose you now proceed to enlighten us a little bit more about this journey. Here we are in the middle of space somewhere. All I'm aware of is sheer existence. So far as I can tell, we are a mere speck of cosmic dust drifting aimlessly in space, with not a leg to stand on, not a pipe to smoke, not a dinner, to eat, not a movie to go to; all dressed up and nowhere to go.

"I hope we don't die of sheer boredom. Of course, pardon me, folks, I know you two won't. But we can't be too sure. You know the tales of people on shipwrecked islands; the survivors hate each other very soon. And there's no Reno among the stars, is there?"

"Shut up!" returned Woodlock genially. "Now, listen to me, pals. While we're talking about our relationship, be sure to understand one thing very clearly; something I can speak of much more boldly and confidently since we find each other together out in space, as I calculated we would, after our atomic disintegration.

"I am now convinced that the mysterious nature of the 'nucleus,' which the scientists have called 'the Darkest Africa of matter,' is, in reality, a spiritual substance, the electrical core of life and love itself. We three revolve around it—*positron*, *electron*, *neutron*; each personified in one of us. This is, of course, a hypothesis, but we may verify it somehow before we get through. But, don't you see, that is why I had the idea of us three going into space at one time. We love each other; a complete kind of trinity of the special attraction between positive and negative for one thing; personified in Amelia and me. And also of the more neutral but very powerful thing which is friendship, passion for truth, and the qualities clustering around these things.

"On earth we human beings were always obsessed with sex love, which is all very lovely, but I have always sensed that the more abstract thing, friendship and devotion to deep mathematical intellectual truth, is also a strong, primordial force. Certainly in our atom bombardment one of the major things we learned, didn't we, Greg, was that the most terrific force we could muster was the *neutron*, which has no electricity at all, no mere polarity?"

"Kidding me again, aren't you?" put in Gregory.

"You recall, Greg," continued Woodlock, not noticing the interruption, "how we applied Lawrence's technique and hurled charged deutons at a target of lithium, and the result was a shower of *neutrons*, so powerful that they could pass through almost any matter of the utmost density. That was when I realized that the *neutron*, even though we know it is electrically dead, had a smashing power, a power of penetration, and transmutation or release of energy that was [illegible], almost irresistible.

"MY IDEA was this," Woodlock went on: "I couldn't prove it, because my idea was imponderable, but I have an intuitive flash—and remember Faraday anticipated Einstein by intuition—that the most high-powered *neutron*, *positron*, or *electron* in the world to-day, was probably the human being; each human being taking on predominately one of these three special characters, according to some central law of his being or sex. We three, I now feel certain, represent these three fundamentals of matter, and we revolve around the central nucleus, which is the powerful cohering force or feeling and basic truth-seeking purpose which binds us."

"Why, Art," exclaimed Amelia, "I've never heard you talk this way! It sounds beautiful to me! You talk like a wonderful teacher or philosopher."

"Or some oriental yogi" Gregory smiled mischievously.

"Shut up!" retorted Woodlock. "Believe it or not, we are tied up together into a neat little atomic pattern."

"I agree it's all very beautiful and lovely, Art," said Gregory, "and certainly I'll go to hell for you—maybe I am—but isn't it all a little abstract and sentimental?"

"Not at all, Greg, and that's what I'm coming to. You must remember, old man, we're now out in space, subject to the atomic bombardment that constantly goes on in space. The reason I'm talking in this way is to impress upon us that we're re-created into a new kind of unit of matter, we three, and that not a thing in this universe holds us together except the relationship we have set up. If some other atom collides with us and succeeds in knocking off one of us from our nucleus, or we explode because of some internal friction or change of attraction, we are really done for. These two dangers are the most serious that we face—at least so far as I can tell. So, naturally, why shouldn't I be warning you of what dangers lie ahead of us? If we stay as we are, keeping our relations right, we have mastered a good deal."

"Say, Art," facetiously interjected Gregory, "are you worried because there are three of us—one a woman; and that, therefore, we have the material for a triangle?"

A peal of laughter came from Amelia.

"Will you shut up, you big ape!" thundered Woodlock. "I'm not thinking of triangles, except Euclidian ones!"

"Well, if you are," rejoined Gregory, "just remember that I'm in a wonderfully sweet position for it. First place, I'm just a *neutron*, like a sexless worker bee, and no longer can care a damn about anything stronger than friendship; and in the second place, without your brain to guide, I'd be merely a charred piece of cinder falling out of the sky, done for."

X.

"ALL RIGHT," responded Woodlock; "we understand each other and are prepared for peril No. 1—lack of internal cohesion. Peril No. 2 is not so easy. Space is full of matter; in fact the matter existing in atom form, floating in space, is greater than the total matter in all the billion-billion stars which exist. But even so, space is as empty of matter in the same degree as a hollow ball the size of the earth which has just one grain of sand rattling around inside."

"Really?" asked Amelia wonderingly.

"My simile is an actual calculation; that's the exact fact, by measurement and calculation. It means that space is certainly empty enough not to worry about; but just the same if enough atoms should collide with the great majority of the light particles carrying our pattern, we would forever be mutilated and changed. You or Gregory or I may

be knocked off, but there is nothing we can do but hope and take a chance."

"Just what does 'forever' mean in our circumstances?" asked Amelia. "From the various attempts you've made to explain relativity, I gather that all kinds of queer things happen to time."

"It may interest you to know, my dear," replied Woodlock, "that you're going to have to live with me forever. There is no more time. We are ageless, timeless, eternal, now."

"What do you mean?" asked Amelia intensely.

"Don't you recall, dear, when I explained relativity to you, that Einstein had proved, and the scientific world fully accepted, that for anything traveling at the speed of light—186,000 miles per second—time actually ceases to have any meaning or duration whatsoever? This is because the tick—representing one second—of a clock which is traveling 186,000 miles a second lasts forever. The speed is so great that all chance of measurement of time is lost, and all significance to measurement of time is ended. The whole conception of time, such as human beings commonly know it, is thrown into the realm of relative mathematics."

"Which is where we are now," added Gregory.

"Which is where we are now," confirmed Woodlock.

"But," insisted Amelia, "do you mean to say that hours and days and years are not clicking by? That we no longer age?"

"No, my dear," responded Woodlock. "Of course, if we could conceive such an absurd thing as a human body traveling as fast as we are, time would stop also, but the body would die instantly, because it couldn't stand such speed. A human body is an earthbound thing, subject to the conditions of the earth. Therefore, the only thing which really is able to travel with the speed of light is matter in the form of a ray of light.

"We changed our human bodies into light-rays. That is why we are here—and still conscious. We have proved, what has been suspected by many, that even an atom of matter has a form of consciousness. We made ourselves over into the only thing that could travel so fast. And now time is to us a childish thing, which we have cast behind us.

"It was a fantastic thing anyhow, our earth time; because no clock anywhere else in the universe agreed with it. The universe is like a village of people, with every clock in every house ticking a different tune. The earth said an hour had passed, but on another planet they would say, what do you mean, an hour? Our clocks say it is fifteen minutes! Each planet traveling at different velocity had a different time scale. As for a star—well, the light from a star has been traveling 150,000,000 years, and the star whose light you see may have exploded long before there was a living thing on earth! So there is no such thing as simultaneousness in time. Even on the earth there are differences, for the earth had four or five separate motions, all complicating the time factor. A second ticked by the clock down at Quito, at the earth's equator, has always been longer than a second ticked by a clock, say, down at Admiral Byrd's Little America, down near the south pole, because the velocity of the clock traveling through space at the equator, because of the earth's rotation, was greater than that down at the south pole."

"But, Art," said Amelia, deeply interested, "there is something wrong with all this talk about there being no time any longer, because you speak of our traveling at 186,000 miles per second, and about coming back to earth later, and all that."

"The speed of light is now our only clock," replied Woodlock. "That is a clock which does not change anywhere in the universe, apparently."

"Why not?" insisted Amelia, with womanlike meticulousness.

"Well," answered Woodlock, "it is demonstrable mathematically that there is no possibility that matter or energy can go faster than this. The mathematicians can prove that if you travel faster than 186,000 miles a second, you get ahead of yourself; you meet yourself coming back after you've just started. Have you ever heard of Professor Buller's little Limerick—maybe you are the girl in it:

"There was a young lady named Bright,
Whose speed was far faster than light,
She set out one day
In a relative way,
And returned home the previous night."

"In other words, Amelia," put in Gregory, "if we were traveling a little faster than we are, we'd suddenly find ourselves back in the hangar on the day before we left."

"How weird!" exclaimed Amelia.

"HERE'S what's bothering me," said Gregory: "where the deuce are we headed, for now, and why and what do we do when we get there? I have no sensation of speeding along anywhere; I feel as motionless as if I was sitting on a rock on top of a mountain. You fellows may be thrilled with a lot of talk about relativity, but I'd like to see some action.

"I'm the detail man on this expedition, but so far Art has been mooning around up here in space like an oriental astrologer. I say, let's get organized for our job, whatever it is. What I can't figure out is if we were shot from Big Bertha radially in all directions, as rays of light, what can we say as to where we are right now? Are we in the rays that shot westward, or in the rays that shot eastward?"

"Don't get impatient, Greg. Hurry isn't one of our worries now. As to your question, the answer is, we are patterned particles made by the key matrix, and we exist simultaneously in each and all of the particles, wherever they are."

"Hell's bells," rejoined Gregory, "do you mean that we get bumped off if a collision happens to any one of the particles that compose our multiple selves? That's like the Hindu suttee system—if you die your wife must die, too."

"No, Greg," said Woodlock; "you're still thinking in earth terms. Our consciousness entity, because its pattern was set by key matrix, exists universally now in space, within our increasing travel radius, and is traveling out in all directions at the rate of 186,000 miles per second. But time and space now have entirely new meanings according to the Einstein-relativity theory, as I have tried to explain so often. Why the deuce, with your technical competence, Greg, haven't you ever mastered the Einstein-relativity theory?"

"I'm not one of the twelve men who can understand it, apparently," loftily rejoined Gregory. "Then we're not to picture ourselves like three people perched on a rocket and holding on tight while we're shooting out in a particular direction in space?"

"Certainly not!" said Woodlock. "That's mere childish earth imagination. You must think of us as radiating outward in all directions as a form of light and with the speed of light. We may consider ourselves to be at any one of the points, around an ever-widening circle, that we choose to be. We are——"

XI.

"HEY, ART, what was that?" suddenly broke in Gregory.

All three had suddenly felt a violent electrical shock and experienced a sense of momentary dizziness of faculties; a feeling of attempted mutilation.

"Don't pay any attention to it," re-

plied Woodlock soothingly. "I've been expecting it to happen any moment. One of our billions of key-matrix units has just had a collision with some particle of matter traveling in space and is mutilated. The ghost of one of us three—I don't know which one—is now doomed to wander endlessly and alone through space until it can collide or coalesce with other particles and form something brand-new. It will happen often. It could only be really dangerous if nearly all our key-matrix particles were suddenly pulled into some great nebulae near by and absorbed."

"Do you mean," asked Amelia wonderingly, "that in this collision that just happened the *electron*, or *positron*, or *neutron* was knocked off and must travel alone, separated from us?"

"Exactly that," replied Woodlock; "your description is almost professional."

"Does that mean that a lot of the tiny duplicates of you or me or Greg are constantly going to meet such accidents and have to travel alone after that?"

"Correct," interposed Gregory; "there I know my ground. Collision of atoms or particles is old stuff to me. Seen it in our lab photographs often. Just picture a lot of cosmic gangsters wandering around up here in space, and picking, as a victim, one or another of the *neutrons*, *electrons*, or *positrons*, and taking it for a ride—bumping it off, so to speak. After that you wander like a lost soul all alone in the Great Open Spaces! But don't fret, little *electron* Amelia; you may meet some other-nice *positron* somewhere up here in the white-light district and join up with him, and forget all about Art, your present beloved *positron*."

"Shut up!" growled Woodlock good-naturedly, in his old manner.

"But it won't affect us really, will it?" asked Amelia, a bit alarmed.

"Hardly at all," Woodlock reassured her. "Just get used to the little electrical shocks which register that the collisions take place somewhere in our radius. If we should ever be plunged completely into some nebula or supernova, we would scarcely know what happened to us; just sudden oblivion. All the light-waves of our pattern would be swallowed up, as a little flock of minnows is washed into the mouth of a whale."

"Still you don't tell me," complained Gregory, "what's your working plan of action? There's evidently no steering this 'rocket' of light-ray we're riding on. Can we wish ourselves into any particular direction? If so, let me see how the wisher works."

"Still mechanical, earth-minded!" chided Woodlock; "forget your gadget mind now, Greg. We're out of the realm of organic or strictly mechanical action. We're riding all the light-waves of our pattern; remember a light-wave consists both of particles of matter and of wave patterns.

"You ask, what's my working plan. It's this, Greg: we must develop a kind of electrical consciousness, such as we just experienced a little of when a collision occurred in our radius. In this way we shall develop a sensitivity to our surroundings. It's like being blindfolded and learning to kind of feel your way. To this we must join our mathematical and other knowledge, and then, as we travel farther and farther out into space, we shall undoubtedly encounter those things which occupy space. All we can——"

Whang!

"O-o-!" said Amelia. "I feel all jangled and shaken!"

All three had experienced suddenly a feeling of tension and strain.

"What was it, Art, dear?"

"I think a comet smashed through, not far off, somewhere in or near our radius. It wasn't much. We'll get worse things. Remember, our radius is increasing, just like the circles on the

water increase when you throw a stone in a pond, as we ride out farther into space, in all directions. The shocks will become greater in number, but less in force."

"When we get near the stars, what then?" asked Gregory.

"Well, I was afraid of the sun, but we got by without more than a little shake-up. It happened about eight minutes after we woke to consciousness—because the sun is only 90,000,000 miles from the earth—and we were so dazed that we didn't seem to think it very much. So I imagine that in the case of other stars we won't mind much, either. Even though these great stars may be 150,000 times as large as our sun, they will not hit anything like so large a sector of our radius. It's like a shotgun: it's fatal at close range, because the whole charge strikes you, but at long range only one of the little shots may strike you."

"STILL you don't tell me what we do," commented Gregory impatiently. "Do we just sit still during all eternity, while we go over a series of endless bumps and thank-you-ma'ams, as we ride around the Milky Way—which is evidently still a dirt road—or do we do some measuring or exploring, or record a log, or what?"

"No!" exclaimed Woodlock. "Must I tell you big lummox again that we are in a world now of primordial matter, where the only instrumentality we have is our brain and spirits? We're not a Beebe exploring the ocean bottom with a steel-and-quartz diving bell, or a Picard in a stratosphere balloon, all chockablock with scientific gadgets. We are reduced to primeval particles of light without hands or feet or a stock of instruments. Your atomic brain must be your instrument, Greg, and your memory your log. Why not——"

Zzzv-zzzv!

"What's this, Art?" called Gregory, as a very powerful force seemed to seize them and whirl and rotate them with a very mighty but rhythmic motion.

"We are rather near," Woodlock replied seriously, "to a super-nova, that is to say a suddenly exploding star, not necessarily in our Galaxy, but possibly the Magellan Galaxy, next nearest to our own. What a fatal coincidence it would be if a super-nova had occurred near us in our own Milky Way! Ten of them explode every year there. We've been lucky again. Do you feel that we're being deflected and whirled?"

"I feel as if I'm riding on a Coney Island roller coaster!" said Amelia ruefully. "What is this thing you speak of, Art? An exploding star must be awful!"

"It's some explosion, I'll say," replied Woodlock. "Within thirty-six hours after such a star explodes, its brilliance increases thirty thousand times, because it shoots outward a body of flaming gas at the speed of about 100,000,000 miles a day. But, of course, we are traveling one hundred and sixty times that fast, or sixteen thousand million miles per day; so we are like an airplane racing with a turtle. We can easily outdistance the exploding star if it does not occur too near us."

"Art, dear," said Amelia suddenly with definite apprehension, "don't you notice anything? I feel a terrific pull at me, and it's getting stronger all the time. It's—it's like a hand at my throat."

There was silence for an interval.

"Greg, old boy," suddenly Woodlock said in a definitely concerned manner, "there's something up—I suspect that super-nova was much nearer than I had calculated." Then to Amelia: "Never mind, darling, we're here together still. If anything happens and we get separated, remember that time means nothing—we'll be reunited in some fashion somehow, even if—— Greg, that pull

is growing more and more intense. I suspect the worst."

"What can happen?" asked Gregory.

"The super-nova, or exploding star, is undoubtedly right in our radius. It will probably absorb all or nearly all our key-matrix light particles. In fact, I'm sure of it—you feel the awful pull? Amelia, darling mine, it may be we're done for now; we'll be sucked into a great vortex, perhaps, and knocked apart, we three. But we can't die, sweetheart, whatever happens. We'll find——"

"Oh, what an awful, awful pull! It's getting worse," moaned Amelia. "Don't leave me; don't leave me, Art!"

"Is there nothing we can do?" fiercely demanded Gregory. "I hate an expedition without any apparatus and no chance to fight."

"I told you our only instruments and equipment were our brains," snapped Woodlock crisply, grim will and determination showing in his phraseology. "We have only one chance."

"What's that?" replied Gregory. "That pull is something frightful! But strange to say I feel very stimulated by it. Courage, Amelia! What's that chance, Art?"

"The Heisenberg principle of uncertainty," replied Woodlock solemnly. "Particles of light in the mass act rigidly according to the laws of force, and must be absorbed and destroyed by such a thing as has hit us. But individual atoms or *electrons* or *neutrons* or *positrons* sometimes refuse to obey such laws; that is one of the most remarkable of the developments in science, as you know, Greg."

"Another one of those questions like relativity, which I could never master," growled Gregory; "although I've sat up nights reading what Professor Heisenberg and Professor Compton said about it."

"Never mind about understanding it now," commented Woodlock; "if it saves us we'll have time to understand it later. I understand the theory, all right enough, but the great question is, if one or more of our billions of key-matrix light particles balks or escapes being sucked into the forty-million-degree furnace represented by that exploding star, will we be destroyed or saved? Will we, with out consciousness, ride on that one, or those few free-will atoms?

"I confess I don't know, Greg. I know that there are fair mathematical chances, on the Heisenberg theory, that some of our key-matrix light particles will refuse to obey the laws of force, just as they did in Compton's many experiments in X-ray light diffraction. But up to this time I have been roughly calculating that our conscious entity would be destroyed if a majority of our key-matrix particles were destroyed. There is a chance that I am wrong; that if even just one of our key-matrix particles balks or escapes, we, too, will be saved. We are right up against that little gamble now."

"Isn't there anything I can *do!*" fumed Gregory.

"Go back to earth and get a Stillson wrench," mocked Woodlock, "and start opening the plumbing."

"Art, dear," said Amelia, "don't tease poor Greg. Oh, dear! I have a sense of being drawn through a keyhole, or pressed through a wringer. And I feel as if some Gulliver has grabbed us in his great hand and is slowly crushing us."

"He has," replied Woodlock sadly; "he is."

XII.

"HOW the dickens will we know whether the Heisenberg principle of uncertainty is saving us?" asked Gregory most unhappily. "I'll say it's a 'principle of uncertainty'! You just sit around uncertain, while you're just dying to get up and bust somebody in the

face, or use some gadget to beat the racket, or take some action. I feel terrifically restless and wanting to do things. I'd like to hop off and take a look around. We haven't even a telescope to see our vicious enemy."

"The only way we'll know we are winning is if the pull begins to slacken and we are not annihilated. But that pull is increasing, isn't it, Greg?"

"No doubt about it."

"Well," said Woodlock suddenly, more cheerfully, "we took these chances; let's not whine about them. If I could be safely back on earth, without having tried this experiment, and had to promise never again to try it, I wouldn't choose the alternative. I won't ask you two about it."

"I'm with you, Art," replied Greg heartily. "By George, I can't say it isn't adventurous."

"Oh, I don't know, Art," wavered Amelia. "I can't help wishing—*a little*—that we were safely back on earth."

"I understand, dear," soothed Woodlock. "This is all rotten nonsense from any woman's or any sensible point of view."

"It is not!" protested Amelia loyally. "Don't let's say another word about it. I couldn't bear not to have come!"

"This Heisenberg principle of uncertainty," Woodlock mused, "simply set up the dictum that it was impossible for human experiment to determine at the same time both the velocity and the position of the *electron;* and this we are able to say, and Compton verify, that while the large numbers or masses of units obey the fundamental laws of matter, individual units break away from law and prediction by law. Evidently, old pals, we are now going to test something I never expected to test. We are going to check on the Heisenberg theory in a breath-taking, new, and significant way, and illuminate the whole philosophy of individuality, free will, the mechanistic nature of the universe."

"What do you mean?" asked Amelia miserably, taking Woodlock's cue of beguiling themselves with discussion. All three were in a state of suppressed agony and duress.

"My dear," replied Woodlock, "I may, of course, be romancing, but now that I reflect on it, we may—if we escape—have stumbled upon a far greater work than any I ever dreamed of. We may actually ferret out the spiritual secret of the universe. If we actually ourselves become that strange billionth particle of light which thumbs its nose at all the laws of force which supposedly hold the universe together; if we, with all our consciousness and background of knowledge, can interpret to science what goes on in such a lawless, fearless atom, defying all the vast thunder and lightning of natural law—why, we will become most superbly, uniquely important."

"You're talking pretty big for a fellow who's shoving headlong into the hottest hell-hole, an exploding star, that man ever dreamed of!" commented Gregory a bit sourly. "Out like a light we'll be, pretty soon, I guess."

"Greg, I swear that it seems to me that this terrific pull is slowing up," Woodlock said with sudden excitement.

"I don't know that I notice it," replied Greg sarcastically. "I've heard that men dying of thirst in a desert usually see beautiful springs and waterfalls."

"Shut up!" said Woodlock with intensity. "I don't believe I can be mistaken."

"Yes; it's true!" soon remarked Amelia. "It's true! I feel it definitely less!"

Greg grudgingly admitted the fact.

WOODLOCK'S mind rose to a high pitch of keen anticipation. "Yes; and I can't explain it in any other way ex-

New York is now more ancient to us than the cave of a Neanderthal man was when we left. 60,000 years have slipped away.

cept that we have now become identified with the one or more lawless particles which have defied and escaped the Coulomb law of force.

"You don't know what this means!" he said with high excitement. "You perhaps haven't taken the time, Greg, to realize the deep-reaching nature of this Heisenberg principle of uncertainty, and what it has done to science, philosophy, even religion. Our stake is now far more daring than anything I ever

dreamed of. We're now an outlaw in space, masters of natural law, and conscious of it! There is no adventure that could possibly be more stupendous for us!"

"Stop raving," said Greg. "I don't know what the devil it's all about. Your mind is too damned fast. Let me get this: You mean that one or more out of the billions of our key-matrix atoms of light have failed to let themselves be sucked into this nearly exploding star, but have gone on their way resisting the laws of matter, and that automatically our consciousness hopped over onto them, and is now escaping with them, just like Eliza on the ice floes escaped the bloodhounds?"

"Crudely put, that's it," assented Woodlock; "the proof of it would seem to be in the fact that we were not destroyed. Of course, an alternate hypothesis is that not just one or a few, but perhaps as much as 20 per cent of our atoms escaped, but it seems to me unlikely.

"Quick calculations I've made in my mind indicate that we certainly are still in the very middle of our own Milky Way Galaxy, and not in Magellan, and we are still very powerfully in the grip of any large super-nova which might occur on a considerable area of our Galaxy. I cannot very easily explain our escape except on the Heisenberg-Compton principles. How are you, Amelia?"

"Very much happier, dear!"

"I am now going to try a perfectly crazy experiment. Will you help, please? Remember, now, my theory is that we have had the breath-taking good fortune to become identified, not with our great mass of key-matrix atoms—which are now probably no more—but entirely with a few selected so-called 'lawless' ones among our atoms which do not obey the laws of matter. We are freed from the chains that bind practically all the universe—such is the logic of this theory.

"The super-nova by its explosion has lifted a leaden load from our shoulders; a very heavy handicap—handicap No. 2 in our great adventure. No. 1 was when we disintegrated ourselves as human beings, and thereby freed ourselves from the limitations of organic life, from time and space. To this freedom is now added the freedom from handicap No. 2—the handicap of natural cosmic laws. This leaves us—please don't think I'm altogether insane—this leaves us, if I am right, free to operate ourselves on will alone.

"Of course, it may be that there are other limitations we will discover, because there must be some further master-principles, or perhaps even a master intelligence in the universe, which will limit the exercise of our wills. What I am now about to do is to test this theory."

"What in Heaven's name are you going to do?" asked Amelia, sensing the high excitement in Woodlock.

"I am going to have us unitedly express our will to be carried at once into the presence of the guiding spirit, principle, or ruler of the universe. I want you all to repeat together with me these words: 'We will to be ushered respectfully into the presence of the central guiding principle of the universe.'

"Let us all now repeat these words together: 'We will to be ushered respectfully into the presence of the central guiding principle of the universe.'"

XIII.

TENSELY all three awaited something, they knew not what. And waited in vain.

"You let your abstract imagination soar too high that time, Art," was Gregory's laconic comment. "Better get down to brass tacks now. Let's tackle something more concrete."

"I suppose I'll never really train you out of your earthliness, Greg," commented Woodlock, a little crestfallen.

"I'm made that way," cheerfully retorted Gregory. "Don't you remember what a *neutron* is? It's the first step in the evolution of matter, in the building up of the common primeval stuff of life. I'm close to earth, Art."

"Yes, I know," shot back Woodlock, "and I don't forget, either, that a *neutron* is only the first step—only the embryonic form of ordinary matter. Let that hold you for a while. But wait—where has my brain been? I've been nodding, Greg.

"I have an idea. Chadwick himself, back in 1931, when he discovered the *neutron*, ventured a guess that the cosmic ray which, as you know, has been leading science a wild-goose chase for a long time, might be composed of a stream of *neutrons*. Hold that fact steady in your mind; now recall the Baade-Zwicky theory that super-nova —star explosions—are the real source of cosmic rays. Get what I'm driving at, Greg?" Woodlock was quite intense.

"No," said Gregory.

"Well, do you remember how you insisted that you were exhilarated and felt stimulated, like 'hopping off and taking a look around' during the terrific pull of the star explosion we just went through—whereas Amelia and I were distinctly depressed?"

"All right; what of it?" queried Gregory.

"My theory is," continued Woodlock, "that the Baade-Zwicky postulate is right; exploding stars—super-nova—do create the cosmic rays, and they are streams of *neutrons*. That was why you felt at home in them."

"So what?" persisted Gregory.

"Well," mused Woodlock, "I'm thinking of letting you make that hop-off the next time a super-nova explosion hits us and go on a side exploration trip."

"Great!" exclaimed Gregory.

"Oh, no; don't let's separate!" came from Amelia.

"But how could it be done?" asked Gregory.

"I insist that we are a free-will atom now, and that we can, within limits, do what we wish."

"Why not let me go now?" eagerly asked Gregory. "We are by no means out of the range of the gas of that exploding star. I still feel that exhilaration. Do you mean to say that if you gave the word I could hop off?"

"Yes, I do. And I think you are right—you could hop off now. But let's consider. Remember, what I want you to do is to join the stream of *neutrons* composing the cosmic ray. You must see what they do, how they act, where they go. Are they creators of matter, as Millikan thought? What's their secret? But you must come back."

"Oh, yes, please!" said Amelia.

"How do I do that?"

"Before we talk about that I'm going to test out my free-will theory, not in the asinine way I did a little while ago when I tried to reach the Creator's throne, but in a practical way. We will now all say together: 'We will to be whirled near enough to the nearest star to feel its terrific pull, but no more.'"

Together they said the words. Instantly they felt precisely that same awful centripetal force which they had felt when the exploding star had passed into their radius.

"Now, quickly, repeat after me," said Woodlock: "'We will to come away from this star which is pulling us.'"

Again the instant response: the pull of the star was gone.

Woodlock was profoundly elated. "There! I told you! It is definitely proved—we are a free-will atom, ranging about the universe, but with the unique distinction that we have concen-

trated in us the essence of the human memory, mind, will, and consciousness. That is stupendous, incredible, mighty, unparalleled!"

"Sounds like a movie ballyhoo," commented Gregory.

"But it means, Greg, that I can whirl Amelia and myself to a given spot after you've made your side exploration, and you can hop back to us."

"I hope so," replied Gregory; "I wouldn't like to be one of these ghosts roaming around space alone. What do I do now?"

"Get going," replied Woodlock briskly, "before the cosmic-ray stream of *neutrons* gets too far away. You may be lucky; you may catch cosmic rays in the act of atom-creation. Remember, they are much more powerful out here in space than on earth; and remember also the astounding fact that there is about three hundred times more cosmic-ray energy than all other kinds of energy combined.

"So you see you've got an important assignment, Greg. Millikan found some cosmic-ray tracks reaching as high as 2,700,000,000 volts, which is a great deal more than enough to create uranium, the heaviest element of matter known. Ready?"

"Good-by, Greg, old dear!" called Amelia.

"Ready!" said Gregory.

"Let's all say *go!*"

"Are you gone, Greg?"

No answer.

"Good, he's gone!" exclaimed Woodlock, quite boastfully.

"Hey, there! What's the trouble? I went away and now I'm back again! What's up?" Gregory was suddenly back.

"Well, I'll be darned!" exclaimed Woodlock.

"I felt I was away—then suddenly I had a sense of being turned about and pushed back," explained Gregory.

Twice more they tried it; but always Gregory was back a little later.

"There's a force opposing us," said Woodlock suddenly. "I feel it. It's like some will opposing ours! The fact that you actually leave us for a period is proof that we have the power to do it. By gum, I won't be checkmated! Let's try again."

Then an astounding, incredible thing happened.

A distinctly modulated, strange voice spoke, from out of nowhere:

"It is not our will that your *neutrons* leave you. You shall hear more about this later."

XIV.

"GREAT JEHOSHAPHAT!" burst out Woodlock, as Amelia made an exclamation of alarm. "What was that? Did you hear it, Greg?"

"I sure did," Greg replied. "Now we are in for it! It's a challenge!"

"If it is," replied the utterly mystified Woodlock grimly, "We'll take it. I'm not afraid. But, Greg, this puts a frightfully new face on everything. There's somebody ahead of us—somebody who appears to have a slight edge on us; maybe somebody out to kick us into the eternal night. We're in a hot spot!"

"Maybe it's God!" cried Amelia superstitiously.

"Make ready for a real fight on this," said Woodlock. "It's dog eat dog up here in space; that appears certain. We must win, or we may be doomed to revolve around some object of the sky for the rest of eternity."

"What'll we do?" asked Greg.

"Instead of speaking our will out loud, we'll internally wish it, simultaneously. Now!"

True enough, Gregory left his two companions once more. He seemed to be gone a little longer than usual—but back again he came.

Woodlock raged. "I will wish it

alone," he said, "and after he is gone we will keep willing constantly that he does not come back."

Now came the crucial test. Gregory left them, as soon as Woodlock alone willed it, and then, like Jacob wrestling with the Angel, followed a struggle, as they persistently willed Gregory not to come back. Amelia and Woodlock became aware of a sudden vortex motion, increasing rapidly and whirling them about with such incredibly increasing velocity and centrifugal power that it rapidly lowered their morale.

"Cling on, Amelia!" cried Woodlock. "Keep willing no; keep willing no!"

For himself he fought with the determination of a demon.

"No, no, no!" he said with violent intensity.

But the vortex motion rose to more and more devastating power, and began to pass into space, obviously likely soon to knock Amelia and himself apart and scatter them hopelessly into the arms of some utterly superior electrical force. Woodlock knew he was licked.

Then again the voice spoke, an instant after the vortex motion ceased as suddenly as it began. And Gregory was back with them.

"May we beg your pardon for insisting," said the voice, in quite the serenest and most beautifully courteous tones possible to imagine; "but it is our will that your *neutron* remains with you. There is a good reason. Compose yourself. We shall speak with you later."

"Who are you, and what are you?" asked Woodlock.

There was no answer. Woodlock fumed helplessly.

"Greg, we're caught. Maybe done for. Amelia and I put up a perfectly terrific fight. No use. I'm discouraged."

"But you talk as if it was an enemy," exclaimed Amelia. "Who knows, maybe it's a friend!"

"There's something in that," remarked Gregory. "There was something awfully creepy and queer in that voice, but it wasn't unfriendly."

"Why should we be stopped from exploring the cosmic ray?" asked Woodlock defiantly. "What significance has that?"

Nobody answered him.

"Well," teased Gregory, "you're not such a free-will atom as you thought, eh, Art?"

"I'm profoundly disturbed. I don't mind saying," replied Woodlock. "There's an ominous mystery hanging over us, perhaps an ominous fate."

"Somehow I don't feel so," said Amelia lightly. "I feel I could trust that voice."

"How the deuce could——"

Zoom! At this point all three adventurers in space were aware of something very powerful, enveloping, instantaneous, inescapable. They had the feeling of a great hand laid upon the shoulder—an inexorably, helplessly fast grip.

"There speaks to you through me the voice of the Integrator," suddenly enunciated a presence which Woodlock, Amelia, and Gregory felt very close to them—closer than the other voice. It was of infinite ease, kindliness, poise.

"Yes; we listen," replied Woodlock calmly, alertly.

"Oh-h-h!" exclaimed Amelia in sheer sudden fright.

"Do not fear the Integrator," said the voice, with delicate soothing accents.

"We will not," responded Woodlock.

"It appears that one of our laboratory test tubes, namely X9, 257, 643, 2493IW4, 322, 469, S43, 278, P426; which means in language you understand, the earth, has now rather belatedly produced a result we have been expecting. We mean a full-powered, independent atom, competent for our purposes. You are this atom. We must

now expect of you cooperation for our further purposes."

"Pardon me for opposing you," Woodlock managed to say.

"Please have not the slightest trepidation," replied the voice. "You are now of adult stature in the cosmic realm and it is important that you acquire no sense of subservience, inferiority, or fear. The very reason for our experiment with life in our various test tubes is that we want to develop full-powered, independent co-creators. Your destiny is to be a co-creator. This will all be explained to you later."

"May we ask a few questions?" ventured Woodlock eagerly.

"Certainly!"

Woodlock's mind teemed and throbbed with questions to ask. He was excited and thrilled to the uttermost. Though he had a score of deeper questions in his mind, humanly, he first asked a lesser one.

"What is the particular meaning of the number you gave to the earth?"

"It is merely a classifying number; the P426 represents the number of the planet of the sun, the 'S' number represents the identifying number of your sun in the Milky Way Galaxy; the MW number represents the identifying number of the Milky Way Galaxy in the galactic system to which it belongs; and the X number identifies that particular galactic system in the entire general universal conglomeration of galactic systems. Do I make it clear in your language?"

"Yes," replied Woodlock weakly, his imagination utterly bewildered.

XV.

SUDDENLY, stimulated to a fever pitch of interest, Woodlock regained ability to think. "May I ask other questions?" he eagerly inquired.

"Not all your questions can be answered now," said the voice: "I am only an emissary from the Integrator."

"Who is the Integrator?" shot out Woodlock with explosive intensity, almost dreading the answer. "Is he God?"

"No; not in your earthly sense. It is difficult to explain in terms you can comprehend," was the answer. "He is, as you might say, the Master Mechanic of the Universe. He undertook the task of reconstruction after the Great Catastrophe and has labored long and hard to build spirit and order out of vast chaos. That is why he has been nurturing a great many cultures in what you would call test tubes in various parts of the universe."

"And human life on earth has been just one of a vast number of other test tubes in which other human life was fostered?" asked Woodlock, faintly.

"Various *forms* of life," was the voice's answer. "So-called human life is not of any special significance to us above other forms of life."

"How does human life on earth rank?" awesomely inquired Gregory.

"I am not the one most conversant with such facts," replied the voice; "but it is probably about like the letter 'J' on your alphabetical scale, with 'A' at the top."

"What are other forms like, higher than the human?" fearsomely ventured Amelia.

"I am not now revealing to you matters of that kind," gently said the voice; "I must not disturb or upset you."

"If earth's humans are so low on the scale, why are we of any importance to you?" challenged Woodlock.

"The earth was one of our earliest test tubes. Your geologists, I think, are aware that the earth is over 2,000,000,000 of your years old. We expected your culture to ripen much earlier to the point of transmutation into free-will atoms. You are later in that development."

"Other higher forms of life have at-

tained it before this?" sharply quizzed Woodlock.

"A long time ago," replied the voice.

"How old is the universe?" asked Gregory. "On earth the geologists and the astronomers don't agree on this point."

"Measured in your earth-years, if that is what you wish, it is now somewhat more than a million billion years since the Great Catastrophe when the primordial atom exploded."

"What was the Great Catastrophe?" awesomely asked Gregory.

"Again," gently replied the voice, "I must say that I am refraining from disturbing you at present with matters of this kind."

"You have not said what you want of us?" asked Woodlock.

"It is a long and laborious task to build free-will atoms," answered the voice; "it requires very intricate processes, and the number obtained from one test tube, even after billions of years, is exceedingly small. Cultures in so many countless instances solidify into mere regimented repetitions, not in free-will atoms of daring individuality. Therefore, we must most carefully cull them when they ripen and occur."

"Is that why you would not allow us to let Greg—our *neutron*—hop off?"

"Precisely," answered the voice. "Such action on your part would have exposed your atom to break up. We could not let that happen. We wish you to understand that you are a rare, precious product, an end-result of a great deal of care. We expect you to cooperate with our ends."

"What are these ends?" asked Woodlock ominously.

"All matter, as you must know, is running down, like one of your earth clocks. In time all atoms would settle down into the dead, flat stability of lead. That would be the complete and ultimate end. But the Integrator wills otherwise. He is an experimenter, even as you. He himself was a free-will atom who escaped the Great Catastrophe. He and he alone escaped. He has longed for brother free-will atoms to relieve his vast loneliness; to give help in the race against the awful dark blankness of the ultimate end. He is earnestly, even desperately, engaged in the task of producing more free-will atoms, which are the only hope for the creation of spirit."

"But what is the 'other plane' to which we must go; in ascending the ladder upward to the level of the Integrator?" asked Woodlock with agonizing wonderment.

"You may be placed upon another planet revolving around some different sun in some different part of the universe, there to aid in the work of developing more free-will atoms and mastering better still the mechanics of the universe. Or you may be placed on the staff of the Integrator. This will be decided later."

Woodlock said nothing. He could not; the prospect stunned his consciousness.

"And never go back to earth?" suddenly wailed Amelia. "Oh, voice, don't say that!"

"Perhaps," replied the voice considerately, hesitantly, "perhaps you would not want to go back to the earth. You do not realize what has happened there in your absence."

"Oh, tell us!" begged Amelia, agonized.

"Surely, you are familiar with the space-time concept which your Einstein developed. You must know that while time has been on a new basis for you, based on the speed of light; on earth—alas, my friends, the earth, after a series of new ice ages and other calamities is in a state of almost hopeless decay and barbarism."

"Why?" asked Gregory, in panicky trepidation, "What year is it on earth?"

"It is approximately the year 62,000, as earth-calculated time."

"I—I don't understand," pleaded Amelia fearsomely.

"He means, my dear," explained Woodlock, "that on the earth-time scale, about sixty thousand years have passed since we were there."

"Sixty—thousand—years!"

Both Gregory and Amelia were wholly and pathetically aghast. They were not prepared for such a concept. Amelia felt strangely like having an attack of hysteria. Gregory was shocked silent.

"You will understand now," continued the voice, with still further nuances of gentleness, "why I doubted that you would wish to return to earth."

"Oh, I want to!" pleaded Amelia in distress, her earth-memory clinging to visions of the lilac-covered veranda of her home, her mother, her dog, her friends.

"You must understand, Amelia, dear," explained Woodlock softly, "that almost every familiar landmark is surely gone by this time. New York is now more ancient a spot than was to us the cave of the Neanderthal man in France. There's probably nothing at all left of it—probably the sea washes back up as far as Albany, and the rocks of Manhattan are under two hundred feet of sea, together with such kitchen middens as remain of her once proud skyscrapers."

"And quite without doubt," ventured Gregory, "our granite vault in the Berkshires containing our key-matrix was long ago sheered off and destroyed by the polar ice cap."

"But far more dreadful still," put in the voice solemnly, "is the degradation of man. There are now only stunted, apelike savages in the equatorial jungles. I give you this bare hint to clear from your minds all idea of returning to earth. It is now an abandoned test tube of the Integrator—like thousands of others; some of which have produced free-will atoms, and some have not. But you must also remember, my friends, that you are now in atom form. Technically, there is no such thing as a return to earth, in any manner which could have any meaning to you."

All three sat imponderably silent; their intelligence, their feelings, crushed with the dreadful weight of such news.

"Farewell, earth," suddenly spoke Woodlock softly, as if talking to himself.

"Farewell!" echoed the voices of Amelia and Gregory softly, in unison.

XVI.

SLOWLY the three came out of their profound daze. The voice was still with them.

"I mourn with you," it said. "The earth, truly, was among the half-hundred test-tube plants from which the Integrator had hoped the most. He now hopes and believes that in you are great things."

Woodlock now seemed energized, his mind turning in full strength to what was ahead.

"But we have always thought the sun's planets were a rare accident; the tidal theory, you know—of another star passing near by to the sun in a rare accident and thus pulling matter from the sun, which later became planets."

"Quite true," said the voice; "but you omitted to calculate that in the course of cosmic time and space such rare accidents would happen about ten thousand times, and that therefore there are the same other groups of planets. Many of these, like some of your own planets, are unsuited for life-development.

"But there are about four thousand planets which we have been able to use as test tubes. Others are constantly being born and cooling to a sufficient

state to use. Perhaps I have not told you that the creation and maintenance of life is possible only by the use of cosmic rays which transform radiation into matter and thus set up an integrating, creative effort to counterbalance the disintegrating, destructive chaos of the universe."

"Millikan was right then," murmured Gregory.

"In part," replied the voice. "We are constantly and earnestly busy stoking the furnaces of life, as one might say, supplying the cosmic rays. We do this by contriving to explode stars which are of a certain composition and condition and under certain procedures. Thus we warm life into being, and create matter which will give life a chance to exist and develop it to the infinitely complex degree needed to make possible at last a free-will atom. We are now deeply engaged in the problem of creating more planetary systems of the right kind; some way of creating more tidal accidents to yellow suns so as to pull planetary matter from them and give it a chance to cool into planets. We have not enough test-tube planets."

A strange, powerful urge moved in Woodlock. "Let me help!" he cried. "I can see your work now! It must be fearfully, marvelously fascinating."

"Absolutely!" said Gregory, infected with the same enthusiasm.

"Oh, I want to help, too!" cried Amelia. "There is nothing else left for us to do!"

"The Integrator must know vastly more than we ever knew," commented Woodlock suddenly. "Why does he not know all? Why is he not omnipotent? Is there some higher Absolute Being than the Integrator?"

"It is with hesitation that I speak of such things," replied the voice slowly. "They are as yet difficult for you to comprehend. The idea of God has been for you too simple, too static. God-nature is consequent upon the creative advance of the universe. God is dipolar, with a consequent as well as a primordial nature. The Great Catastrophe a million billion years ago was a birth and a death of God. God is perpetually perishing and perpetually being born.

"The very consciousness of being for God, Integrator, or man, is also consciousness of process and novel advance. Only the final goal is an illusion; only the struggle and strain toward spirit ends has truth, reality, beauty, worth. But I strain you with such thoughts. You will later master the mathematics and philosophy which explain such things as I have told you."

"But tell us," urged literal-minded Gregory, "aren't these distances between Galaxies and super-Galaxies; yes, even distances within one Galaxy, almost untravelable? We have believed the speed of light very stupendous, but at 186,000 miles per second, it takes 100,000 years merely to cross the width of our own Milky Way Galaxy, with its ten billion stars. As for the many other Galaxies, it would take an infinity of time to reach the nearest one; and there are about one hundred million of such Galaxies, each one also one and one half million light-years apart! On top of this you speak of this whole great Galaxy as being but one of a series of other great Galaxies; a super-Galaxy. Now how is it possible for even the Integrator to work in a mechanical set-up like this, at such awful distances? How does he communicate? The speed of light in such a set-up is so slow that a snail on earth by relative comparison is a racing automobile. Light must be quite too slow for such utterly stupendous stretches of space."

"Oh," replied the voice, "I have forgotten that your Einstein and those who followed him never did succeed in unifying the electrical and gravitational fields. You are, then, ignorant of the

fact that the velocity of light is vastly exceeded by the velocity of gravitation."

"Oh," exclaimed Woodlock, in great surprise and considerable puzzlement. "I thought the Lorentz transformation equations——"

"—— definitely limited all possible additional velocity for matter or energy," eagerly finished Gregory; now thoroughly at home in his subject.

"Ah, perhaps from the old point of view of matter and energy," replied the voice, "but not for Spirit or for cosmic rays. The velocity of gravitation is actually nearly—but not quite—infinite, and what you, therefore, fail to realize is that this brings about third-order effects of very great smallness. My dear friends, the universe of the Integrator is as near, as close together, as the objects of small form on earth. He can communicate almost instantaneously."

A COMPLETE silence greeted this pronouncement. Woodlock was muttering to himself, "third-order effects," "near infinity," as he was endeavoring to make his intelligence take in the concepts so casually put before him by the voice. Gregory was laboring unsuccessfully also.

"One of my first tasks for you," continued the voice, "is to induct you into those facts about gravitation which are still a closed book to you and which will be all-important in your work. The speed of light is now comparable to the speed of the ox cart in relation to the airplane on earth."

"Will we, then," asked the irrepressible mechanic in Gregory, "be able to travel about the universe—to any part of it—Milky Way, Magellan, or super-Galaxy—instantaneously?"

"Why, of course," replied the voice, matter-of-factly. "Even as I do!"

"What of the mystery of the stars at the far outer edge of the universe, which seem to be traveling with incredible speed, with a red shift on the spectrum, as though the universe was exploding outward?" asked Woodlock, insatiable for more knowledge.

"A very good guess, that explosion theory of your Abbé Le Maitre; it is the latter part of the Great Catastrophe that you saw. The primordial atom is still exploding; the outer parts still traveling at great speed. But remember, too, that the mechanical movements of the universe are complex—there is diffusion, radiation, pressure, but also lambda—cosmic repulsion—going on simultaneously.

"Not even the Galaxies are spread evenly, nor is density. You have yet to delve into the deeper facts about gravitational attraction and repulsion; therefore my vocabulary of terms would confuse you. I may say that the key principle is immediacy of oppositeness, disjunction and conjunction joined in a new relativity.

"But we will get into philosophy again unless I desist; life is always beginning and ending, both simultaneously. Thus is the life-giving tension maintained, without which we would repeat the primordial mistake, before the Great Catastrophe, when all matter had compressed and stabilized itself into incredibly heavy particles; finally into one great dead, static atom; a very ghastly mistake which had to be undone. Immense work awaits the aids of the Integrator in his struggles to conceptive realization."

Set Your Course by the Stars

A story by

Eando Binder

JASON GARRARD, his flaxen hair twisting in the stiff, cool breeze, pulled himself to the platform level, heaving a sigh of relief. He turned to give a hand to the diminutive Professor Ortmann, who had come up the narrow steel stairs right after him. With a little birdlike skip, the scientist leaped to the metal dais, holding fast to Jason's strong, firm hand. Then they looked at each other.

"At last," breathed Professor Ort-

mann, his naturally high-pitched voice throaty, "at last, Jason, the great moment has come!"

The younger man nodded carelessly. He was tall, with the build of a marathon runner, wide-shouldered, lean-waisted, stronger than most men. Yet, despite the well-developed muscles and firm flesh, he was not heavy; he tipped the scales at only one hundred and sixty. His face had a Roman cast, dark of skin, brown-eyed, somewhat heavily lipped. His hair—unaccountably—was a curly tangle of golden flax, fine-spun, adored by women.

"Yeah, Orty, the great moment. But, ye gods, I thought I'd never get away from the mob down there. I need a few minutes to myself before the take-off, I do. I'm not sensitive or anything, but I kinda need a spell to collect my thoughts and—sorta prepare myself. Inside of me, I mean."

"I know," nodded the other. "The stupendousness of the thing has finally penetrated your reserve."

Professor Ortmann—just "Orty" to the democratic Jason—was small and shriveled, round-shouldered from a lifetime in a laboratory; he seemed like an insignificant pygmy beside the magnificent specimen of manhood that Jason was. His skull was large, bulky, especially in the back, fringed with frosty-white hair, nakedly pink on top. Pinched nose and squinted brown eyes that never ceased to dart about eagerly, thin, bloodless lips—he was like a twittering bird somehow disguised as a human being.

Jason Garrard was the idol of the masses, a Lindbergh of 1940, the first stratosphere pilot to circle the earth around one of its great circles without a stop, from New York to New York—twenty-four thousand miles. Laconic and supremely unaffected in manner, he had become the hero of little boys, the heart throb of women, and the object of all men's respect—and perhaps envy.

Professor Ortmann, on the other hand, had little popular appeal. The populace had barely heard of him. They were skeptical of his importance beside that of Jason Garrard's. Yet, among more elite and intellectual circles, the name of Lemuel J. Ortmann, Ph.D., was a name of repute and genius.

STRANGE, perhaps, that these two diametrically opposite types should be together on a metal platform fifty feet in the air, gazing, the one in quiet speculation, the other in tremulous excitement, at a small, streamlined vehicle with wide wings at each side. Below, on the ground, were dozens of people, gazing upward and talking frenziedly. Outside, beyond the thirty-foot steel fence, were more humans than had ever before congregated in one spot. Cutting the hyperbolic newspaper report in half, there were still at least twenty million.

Twenty million had assembled to watch their idol, their great hero, soar from earth in a man-made contrivance, bound for the moon; for the winged vehicle was nothing more nor less than a space ship. Professor Ortmann had contributed the ship; Jason Garrard was to contribute his inimitable skill in rocket piloting, to mankind's first concerted attempt at the annihilation of interplanetary distance.

Of course, be it understood, the scientist had not built the ship in toto. In fact, he had nothing to do directly with the building of it. The Interplanetary Society of Europe and America had done that; hundreds of top-notch engineers and mechanical geniuses having collaborated in the project.

But Professor Ortmann had put in its heart. It was his engine, an advanced type of rocket motor over those in common use for transoceanic service, that powered the craft. And, most important of all, it was his fuel, new and

secret, and very powerful, that was to give life to the engine. Without this Neo-dynine—the name of the new fuel—the whole project would have been impossible. For mathematicians had long bewailed the fact that no fuel known was adequate, in all its qualities, to make interplanetary flight possible.

Neo-dynine solved the problem. It was a superfuel, capable of sending a man-powered craft to the moon, but the craft must be within certain limits of weight, and there could only be one passenger, himself not too heavy.

Jason Garrard looked at the ship in mute admiration. It was the epitome of trimness, neatness, and streamlining. It was sturdy and yet light, mainly of magnesium-aluminum alloy. From its rear outjutted thirty slender tubes, of tantalum-iridium alloy, more refractory than any other known metal. The nose was blunt, bigger than the rear, inset with a crystal-clear quartz window, inches thick, perpendicular to the ground. The wing vanes looked idiotically thin and fragile, as though a sudden tremor might shatter them to flakes. But actually they were incredibly tough, of highly-elastic beryllium-bronze, supported each by two strongly-braced backbones of supersteel, slender, but unbelievably rigid.

Compared to the giant rocket liners that belched daily across the oceans, the space ship was a toy, no more than ten feet long and four feet in radial diameter; the wings stretched only fifteen feet on either side. But the journey it had before it—considering distance only—was forty thousand times as great as the mere jaunt across water undertaken by a stratosphere liner. Furthermore, it would have to fight gravitation, and a dangerous degree of air friction. Its cost—a hundred million dollars; and also an unguessable amount of research and experimentation.

"My boy," said Professor Ortmann, "need I say that the eyes of the world are upon you now? And that soon our hearts, too, will be with you as you plunge into the unconquerable void?"

Jason shrugged, almost carelessly. "Just a new adventure, Orty. The first time is always the hardest—and the most glorified. Somehow, I think human beings are plain nuts about those things. Few years from now folks'll be taking vacations on Mars and thinking nothing of it."

"It is a great thing," pursued the scientist, a bit crestfallen. "Mankind's first carefully-planned conquest of space."

"Oh, sure, Orty; pardon. I know it's a great honor and all that, for me to get the first crack at it. That part of it I understand."

"You'll do your best, lad?"

For the first time Jason's eyes became serious, determined. "I always do my best, Orty. I mayn't look like it, but I've got a conscience—or something like that. I mean, that when folks look up to me to do something big, I do it the biggest way I know how."

Professor Ortmann's fluttery little

hand sought the pilot's, and they gripped in heartfelt mutual esteem. "You know, Orty, I think the world of you." Jason hesitated, abashed at his unprecedented display of emotion, then went on with a rush: "Orty, you're really a great guy. Beside you, I'm just a fool with pluck—and luck. You've got brains, intelligence. 'They'—he jerked his thumb toward the gigantic crowd outside the inclosed drome—"kinda think I'm the cake, but you are the one they should look up to."

The diminutive scientist protested in sudden embarrassment, and poked the young pilot toward the ship. "Better get in, lad. Only ten minutes before take-off."

WITHOUT a word, Jason crouched low to enter the vehicle by its small round entrance. A subdued roar came from the people below—the privileged members of the Interplanetary Society who were given the honor of being in the drome till the last minute.

"Jason, wait! Wave to them. You must; they expect it!"

The brawny pilot stepped clear for a moment and waved, then resumed his course, crawling gingerly through the hole with its swung-back door plate. Professor Ortmann peered in, feverishly excited, and watched Jason strap himself in his harness full length, lying on his stomach. In this position, his eyes peered directly through the only port of the craft. His five feet eleven just comfortably took up the total length of the miniature cabin, his shoe soles resting flat against the thick partition that sealed off the motor at the rear. In the appreciable space below his stomach—below the cushioned metal partition on which he lay—was the fuel tank. Just beyond his forehead, built into a slightly sunken, rounded space, was the pilot board, within easy reach of his hands. The oxygen tank and its attached air conditioner, and the small battery-operated heating unit, were both in the nose of the ship.

Jason snapped the last spring clip of his harness and then grinned out at the scientist. "All set, Orty. How many minutes yet?"

The professor glanced nervously at his wrist watch. "Seven minutes. But, Jason, are you sure now you have everything straight? Turn the air conditioner on just before you take off. Switch on the engine and idle it for a half minute. Then, when the release lever is thrown down below, pulling the blocks and letting the ship free, it will surge forward gently. As soon as you feel that—it's your cue, so to speak—you push the A-lever one notch."

The little man paused to gulp a breath and Jason finished: "Then I watch the green pilot light. When it flashes, I am near the end of the runway, and I must give her hell."

"No, no!" screamed the professor. "You'll kill yourself—crush your legs against the back wall! You must——"

"Yes, Orty, forgive me. I know; I must watch the velocimeter and keep under a certain limit. When I reach the stratosphere I watch the step-up dial and see that it reads thirty-two feet per second, or close to it. One gravity acceleration, in other words. Then, at fifteen miles, I can put on anything I can stand."

"And be careful," pleaded the professor, "especially while in the atmosphere. We were forced to substitute wings for a balancing gyroscope because a gyro is so heavy and troublesome. The wings are tested, as you know, for high velocity, but don't take any unnecessary chances, Jason. Keep under the limits set by the technicians!"

"O. K.," Jason agreed calmly. "But I'm thinking of the landing back here on earth more than the take-off. The wings aren't tested for that." He shrugged. "Just one of the chances I'm taking.

"Well, Orty, it's au revoir—we hope. I'll be back in twenty-two hours with more things to tell you than you can shake a stick at. I'm gonna look over little old Luna's homely, smallpox face, and maybe see a few vacuum-breathing moon scamps running around."

"Don't joke, please," said the professor solemnly. "It isn't right, at this time. And Jason—most important of all—don't forget to set your course by the stars; keep the nose of the ship pointing toward Antares. If you slip up on that, you'll miss the moon's orbit, and it will be impossible then to catch up with it."

Jason nodded soberly. "I've had that drummed into me till I'm blue in the face. Space models, charts, lectures, illustrated course curves—it was sickening."

"But necessary," protested the little scientist. "You don't realize what an immense amount of work and thought went into the plans which you know in a few words by heart. Without those meticulous details of the course, you would be lost, Jason."

"I know," grunted the pilot.

"And on the return," continued the professor hurriedly, "you will hit earth's orbit by setting the ship's tail toward Pollux and Castor, the twin first magnitude stars in Gemini, orange and white respectively. And remember, take an orbit around the moon at less than 1.5 miles per second velocity; you will swing completely around without power. And, of course, you can't land. You know that?"

Jason grinned. "And I can't even say 'Hello' to the moon girls, can I, Orty?" He snapped on the pilot-board lights. The chronometer showed only three minutes left. "About time for the seal-up, professor, no?"

There was a scraping from the ladder at the side of the platform and three men appeared. "You'll have to go down, Professor Ortmann," said one. "We've got to seal the door now."

With a mute wave—which Jason returned silently—the little scientist turned away from the vehicle and clambered, agile for his age, down the long stairway to the ground. The three mechanics followed soon after. They had closed the door and sealed it by twisting its inner rim, which was a fine-threaded draw screw, fitting it integrally to the hull.

"What were his last words? How did he look? Was he frightened? Do you think he's nervy enough to carry it through?" These and a hundred similar questions assailed Professor Ortmann as he joined the group below. He attempted to answer, bravely, but choked on the first word. Sympathetically, several Interplanetary Society officials shooed the eager questioners away, and conducted the scientist to the drome's exit. Others began leaving then, for the great neon warning signal had flashed in a blaze of scarlet; the drome must be cleared.

In the housing next to the open-air drome, Professor Ortmann and his immediate party stood themselves before a large window of quartz. Through it could be seen the platform and ship. It was a strange scene, lighted by a sinking sun. Just the large-nosed, white bullet ship, perched atop the strutted steel platform, cradled at one end of the long runway. A breathless hush came over the assemblage. Ten seconds to go!

Suddenly streaks of bluish vapor streamed from the rocket tubes of the space ship. The vehicle trembled like a greyhound at the leash. A half minute went by. Then, with a roar that shattered the air, the tiny craft darted away from the platform, belching long tongues of bluish-red flame backward. It was on its way——

Professor Ortmann's knees trembled, and he sagged wearily into a chair.

JASON GARRARD heard the hissing scrape of the door seal; then that ceased and he was alone with his thoughts. Two minutes. His eyes involuntarily took in the scene through the tiny quartz window. Funny, he could not even see the moon, the very object he was heading for! Yet he knew—they had explained it so painstakingly—that when his ship had reached a distance of 240,000 miles from earth, the moon would be there waiting for him. If, of course, he carried out instructions to the last detail, and nothing went wrong.

"Quite a hop at that," mused Jason half aloud in the utter sealed stillness of the ship. "And it oughta be a new kind of thrill. Just think, Jason, old boy, going out where there ain't no air—nohow! And no heat. Just the stars and the moon, and coldness."

The chronometer seemed to stare at him warningly. He watched the seconds tick by, slowly, painfully. Then, with a careful hand, he turned the motor switch. An even drumming came to him, as though from miles away, and he felt a tingling on the soles of his feet where they rested firmly against the back partition. The rhythm of the motor was a silk-smooth purr, vibrating gently through the hard metal walls. Then he snapped the switch marked "air." Almost immediately a fresh draft of cool air washed across his face.

It took him almost unawares—the sudden surge forward. At last, his cue! With something of a heart throb, his hand firmly pulled the A-lever one notch. The motor roar increased its low rumble and the ship leaped ahead like a frightened deer. Jason looked through the port. The multiple rails of the runway, stretching interminably in a gradual rise, sped monotonously before him.

Then, when the termination, like a tilted ski jump, loomed within his vision, the pilot glued his eyes to his panel of dials. Particularly he watched the little green globe—dark at the moment—in the center. Suddenly it flashed and Jason pulled the lever notch by notch then, steadily. He was free of the runway now, on his own!

The little ship trembled at first, rolled a little, then steadied to the smooth flight of an arrow. For minutes there was nothing to be done. A glance at the altimeter and Jason saw that the ship was climbing steadily. This part of it was just like his long years of liner piloting. But no liner had ever climbed so rapidly. He could almost feel the powerful little motor pitting its strength against gravity, and beating back the drag of that powerful force. Why not turn the nose straight up and —— Jason thought of it; his hand itched to try it. But no go; the motor would burn itself out in five minutes. Gravity could not be directly opposed; one must sneak away from it. The little old law of inverse squares would take care of matters, Jason reflected comfortably. He felt great.

At the acceleration of gravity—thirty-two feet per second—it takes less than a half hour to reach a velocity neutralizing gravity. But Jason, of course, could not use such a tremendous speed while in the atmosphere. Air friction would then have melted the metal craft to a shapeless blob. Instead, he had to climb gradually into the heavens, at a velocity of sixty feet a second, with very much the same sort of maneuver used by transoceanic rocket liners. Since the runway had been set up facing west—in forethought, of course—Jason was motionless in relation to the stars, but streaking at almost a thousand miles an hour over earth's surface.

However, at six miles, well in the thinning troposphere, Jason was able to multiply his velocity steadily. At eleven miles, reaching the stratosphere, he tacked on notch after notch, plunging

like a sword of fire into the all-embracing heavens. Still almost horizontal to the ground far below, the intrepid adventurer applied three gravities' acceleration. The roaring ship screamed through the tenuous atmosphere, striving to cut itself off from planetary gravitation.

In the next few minutes, many new impressions crowded upon the slightly dazed pilot. At twenty miles height, the sky became the familiar blue-black, crowded with stars, although the sun shone in full intensity. At twenty-five miles, the sun's ethereally beautiful halo flushed out of the darkness; its thin ribbon of chromosphere, vivid-scarlet; its corona, delicate-pink and pulsating; and its prominences, brick-red and snaky. At thirty miles, the highest man had ever gone before, the legions of stars were reinforced by other legions. Of all colors, some huge like beacons, some tiny pin points, they threatened to fill the black celestial vault to overflowing.

When the velocimeter—an ingenious combination of altimeter and air-current gauge—registered 6.95 miles a second, Jason felt a giddiness. He was not alarmed. They had warned him that he might experience a new feeling at the moment of breaking away from earth's gravity.

Then he began building his speed to 7.5 miles a second, still tangent to earth's surface. There was no need to swing the ship "upward," for now any direction was "up."

True to the mathematicians' predictions—providing he followed their directions to the letter—he found his ship pointing toward a great angry-red star—Antares, in Scorpio. Not exactly at it—a little to the right and below—but it would be a simple trick to correct the slight deviation. His fingers strayed to four plainly designated buttons beside the A-lever. They controlled four separate rocket tubes solely for the purpose of changing direction. He had but to press the buttons marked "left" and "above."

With a roar that would have drowned out thunder in a denser medium, the dull-white ship plunged through the last rarefied fringes of earth's air blanket. Jason heard but the faintest of buzzes from his rocket tubes, but he could feel the violence of their explosions vibrating through the sturdy walls. The worst was over: the motor had held up under the strain of snapping earth's omnipotent drag. The rest would be easy. He would build to reach 7.5 miles a second, see that he was pointed directly for fiery Antares, and then "coast" to the moon. In nine hours he would be there.

Jason peered up from his instruments; Antares, like a hot coal, would be there at the tip of the ship's nose. His eyes opened wide then, and he stared in utter amazement.

"WELL," said Professor Ortmann, eying Jason somberly, "you landed safely enough. But you haven't been to the moon; you're back eighteen hours too soon."

"Yes, Orty, eighteen hours too soon," said Jason quietly.

"Tell me about it," urged the scientist in a queerly hurried voice.

"Nothing much to tell: swung back at about ten thousand miles, put the ship in reverse and eased her gently—comparatively speaking—back to terra firma. As per instructions, I baled out in my parachute at two miles. And here I am, Orty."

"But why didn't you let the ship drop in one of the lakes, instead of letting it smash to pieces on the ground? You might have killed some one. Besides, we told you explicitly to do that; after all, you ruined millions of dollars' worth of labor and material."

Professor Ortmann's voice was irritated. And more than that, a hidden rage trembled in every tone.

"Got a little flustered," admitted the pilot evenly. "Had a bit of trouble opening the draw screw on the door. Got it open just in time to vamose and no sooner; couldn't stop to play with the motor. Besides—well, never mind."

The little scientist pressed one small hand in the other, cracking his knuckles. There was a long silence. "*Did* you lose your nerve, Jason?" asked the professor then, biting his lip.

For perhaps the first time in his life, Jason got mad. His face went red and he jerked out the words like piston strokes: "So, that's what you think! That's what everybody thinks! I could see it in their faces as they picked me up, drove me to the city. A quitter! A failure! An impostor finally revealed in his true color—yellow!

"Well, they missed their guess; but I wouldn't tell them!" No, I wouldn't tell them the truth when they had no belief in their faces that I might have a reason for missing the goal. I shut up my mouth like a clam, and asked for you."

Professor Ortmann touched the pilot's arm. "And now that I'm here with you, tell me, Jason. I didn't believe them when they told me you had come back a failure. I had to believe you were back, yes, but I refused to consider the suggestion that your premature return had been of your own volition." The scientist's eyes had become bright again; the shadow of distrust had left.

Jason's blazing anger fled completely. "O. K., Orty, it's all right; I understand. Listen, I meant to say a minute ago, that the ship, smashed or not, is useless."

"Go on."

"Because, Orty—because when a guy gets out there in space, there's no way he can reach the moon, nor the planets, nor anything, except maybe the sun!"

The scientist looked perplexed. "But the instructions were clear, weren't they? It was all figured out for you—head for Antares, easily distinguishable, right in the ecliptic; by the time you got there, at a certain rate of speed you——"

"Wait a minute, Orty," interrupted Jason, lighting a cigarette and inhaling slowly. "That part of it was perfectly all right; with all the star maps they made me learn about, only a blind half-wit could have missed. Here's how they put it to me: I should look for the big red first-magnitude star, Antares, among a cluster of dimmer white ones, out there where it's always night. But the funny thing is, Orty, that it *isn't* night out there! Space is white, not black, and the stars don't show up in a white background, nohow!"

"Jason, you're joking—you——"

"Joking, hell!" denied the pilot quietly. "I'm telling you what I saw. After a guy gets out about three hundred miles, the stars begin sprouting from the sky like popcorn. It keeps getting *lighter* then instead of darker—and don't forget at six hundred miles, my course put the earth between me and the sun, so it wasn't sunlight."

"Wouldn't make any difference," put in Professor Ortmann. "Out in space, where there is no diffusion of light, it would be just as dark with or without the sun."

"That's what I heard," nodded Jason. "Anyway, when I hit what must have been nearly pure vacuum at seven hundred miles, the sky was so bright it was like day. No, not like day, more like moonlight. I went on, though, thinking whatever it was, it would change and become black like it should."

JASON puffed at his cigarette; Professor Ortmann watched him with dazed eyes.

"Well, Orty, it didn't change and become night. It simply got lighter—the whole sky, you understand—and at a thousand miles I could hardly see the

moon in all that brightness; and I should try to pick out Antares!"

Professor Ortmann nodded, a dawning light in his face.

"Well, I'm no quitter, and I kept on going, hoping all the time it was some—phenomenon—that would get over with. But it stayed, Orty. Blast it, it got me good and sore, I'm telling you. I went ten thousand miles before I turned back. All I could see then was an even layer of a kind of speckled white all over the whole damned sky! Something like dirty snow. The stars? —hell, they were as easy to pick out as a white rabbit in a ten-acre snow field!"

"And the moon?" queried the scientist in a queer voice.

"Oh, it was there, all right, way down below the nose of my ship. I could see it plain enough, its rim sort of dark against the white background. But you know, Orty, that I couldn't just keep going and hoping to hit the right spot; Antares was just part of a general shimmer. And, of course, it would've been plain silly to head right for the moon. So I had to come back."

Jason ended with a note of finality, pressing the cigarette stub into an ash tray.

"Yes, that's all you could do," agreed the scientist in a small voice. His whole manner seemed that of one crushed by some stupendous revelation. Then he looked sharply at the pilot.

"Have you any idea, Jason, why space is white instead of black?"

The young man smiled knowingly. "Too many stars, that's all. I could see them popping out by the millions, filling the dark spaces, piling up in layers like hailstones."

"But there's no diffusion out there!" exclaimed the scientist. "Each star is just a pin point, due to its enormous distance. For the entire sky to become a uniform white from their light—that means the stars——"

Professor Ortmann stopped appalled, but Jason took up the idea phlegmatically: "It means there are a helluva lot more stars than anybody suspected, and they just don't have any end."

"Then we live," supplemented the scientist, "under a blanket of air that completely absorbs by far the most of celestial radiation. Only the brightest stars, comparatively speaking, are able to penetrate the veil before our earthly eyes. In our telescopes we see at least a hundred million stars. But what a small number that must be compared to what there really are!"

Jason rubbed sleepy eyes. "Next time you send out a ship, Orty, figure out some way of guiding it besides setting its course by the stars."

The Escape

For just an instant, the officers stood like waxen statues after the gun blazed. Paralyzed!

The story of two human beings in a world of walking machines.

by DON A. STUART

AIES MARLAN permitted a slight scowl to creep across her face as she straightened from her posed attitude for a moment. Across the grass court she could see her father's laboratory and that most unwelcome adjunct, that behemoth of tactless condescension, the unbearable, insufferable Bruce Randall. Bruce was looking out of his window toward her with his usual, idiotic grin, that condescending grin with which he watched all her work.

Aies looked across the studio toward Paul Treray. He had not noticed her looking up. He was very busy with his little knives and inductance softeners, working at the silver plastium he was so deftly shaping. The scowl relaxed to a little smile. Paul was so busy with his work. Modeling her and the little laboratory bench she had set up, as a scientist at work. Paul had made second place in the competition in 2017; this year he might get the coveted first with one of his little figures——

Abruptly a gesture and a deep scowl of anger came over his clean-lined face.

"What's the matter, Paul?" she asked.

"It—it just won't be you. It's still—metal. I can't make it you—human."

Aies straightened her back and stretched. "Well, I'm not sorry. That means no more to-day, and, frankly, my back is beginning to say the same thing." She smiled teasingly at him. "I wish you'd start working on seated figures at ease. Do you enjoy breaking my back?

"At any rate—I do want to finish that projector. Besides modeling as a scientist, I like to try to be one."

"You are, Aies," said Paul, his face changing to a sunny smile as quickly as it had scowled before. "You are, but you are so much more interesting as a human—but the metal just won't see it. It wants to be atoms and protons and molecules, I suppose you'd say.

"I still don't see how any one as thoroughly and abstractedly a physicist as your father, and a woman as completely and distractedly a chemist as your mother could have had a daughter so different."

"Paul, you are prejudiced. And remember, please, I am very much interested in science, myself." She laughed at him as she took his hands in hers. "Besides—they didn't spend most of their thoughtless youth with one so foolishly unscientific as you. Perhaps you acted as a sort of balance to me."

"Bah—trying to analyze the situation? Foolish. Results are all that count. I do not know how to model a figure; I cannot give you the angles, the degree of sphericity of the human head—the radius of curvature of a forearm. Only one man ever attempted to reduce art to mathematics—and that was Leonardo da Vinci. He thought he did. But his own students said he didn't, because his formulas didn't work. Results are all——

"Bah," he said abruptly. Aies was looking with a long face at the little figure which Treray declared "would not be human."

"Results," whispered Aies softly to herself almost as she walked slowly, apparently thoughtful, out of the door. "I should say the main trouble was that the ratio between the size of the head to the over-all height of the body was slightly too great."

"Get out!" cried Treray, in mock anger. But partly real anger, because he suddenly realized that that ratio was not quite what it should be. But he didn't like to call it a "ratio;" he didn't like the word.

Aies walked toward her father's laboratory, smiling to herself. Gradually the smile departed to be replaced by a look of determination and coldly repellent dignity. Bruce Randall would be in the way. Aies made up her mind to dislike him the day he came to the house, though not consciously, because she had a pretty good idea why he had been sent to "assist" her father in his research on the new accumulator.

Aies was twenty years, twelve months, and twenty-seven days on the final and thirteenth month of her twenty-first year now. Automatically at twenty-one she knew the Population Control Commission would call her in to "decide" what type of man she should marry. And Aies had not the slightest desire to have it decided for her. What she disliked most was that when they had decided they would, with the aid of the conditioning and control division make her decide the same thing. They'd make her like their decision.

THAT was the rankling thing. She wouldn't have will power enough to disagree with them. They'd make her actually love whoever they picked by their conditioning and control.

It was bad enough to have some one else make your decisions for you—but

to be psychologically manipulated to *like* it!

And she knew blamed well that they'd already just about decided. Bruce Randall was the decision. Well, they'd find she'd take a good bit of conditioning to like him. His face was wrinkled like an old man's; he thought at the rate of about two inches a year, and he spent ten minutes thinking up the answer to a simple question; and that grin, that insufferable, unbearable, awful, condescending grin!

She walked briskly into the laboratory. Her father, she knew, was down at the physics conference this afternoon, seeking some hints on the accumulator connections for use in the plane he had designed. He needed aerodynamic aid for maximum efficiency of weight distribution. The accumulator was perfected; Aies herself was using it in a little device she had perfected.

But Bruce wasn't out. He looked up with his slow smile that crinkled the corners of his eyes. Little glints of humor laughed in his eyes. "Hello, Aies. Paul's chisel slip? He looked peeved when you left," he said in his slow, deep voice.

"No. Paul gets along quite nicely, thank you. Have you finished that accumulator bank dad told you to hook up?"

"NI 3? I guess I haven't. I've been making a cape for myself."

Aies was piqued. She didn't recognize that NI 3 formula. "I didn't know you were a tailor," she said, going on toward her bench.

Aies was an excellent mechanician, and on a miniature lathe she was spinning out an aluminum tube. She paid no attention to Bruce's smiling work and his occasional glances. In some half hour, she had the little tube finished, and fitted into her apparatus. Then she started on some delicate wiring, her attention so concentrated on it she did not notice as Bruce left the laboratory, and scarcely noticed as night fell outside.

There was a grim little smile on her face as she finished, and held in her hand a device the size of an overgrown .45 revolver, connected with a long, flexible lead to an accumulator on the bench. With a quick tread she went to the next room where she had been keeping some pets—ten guinea pigs and a monkey.

She brought the monkey into the laboratory on a leash, the chattering little animal hopping and running about her, squealing and scolding. She released him as she picked up her newly-made device. The monkey dashed off across the room turning half a dozen somersaults as he went—and fell flat on his little pot-belly, and skidded ten feet across the floor as a single blue-green glow surrounded the weapon for an instant. His miniature hands lay limp and bedraggled, the prehensile, looped tail dragged mournfully.

But under the bright gas-glow lights his bright, beady eyes flickered and wabbled about, terror in them. His breath came regularly and evenly. His lips curled back, his mouth and tongue shaped for a scream—and no sound came!

Aies smiled softly to herself as she gathered up the relaxed little figure and carried him to his cage. Then she sat down beside it, with a notebook and a stop watch. Presently the little primate gave a hoarse, gasping gurgle. Instantly some of the terror in his eyes fled, and excitement took its place. Aies smiled at him, spoke to him, and patted his furry back. Then a shoulder twitched. Aies made another note. In forty-five minutes a tremendously scared and immensely excited monkey chattered and threw himself about his cage.

There was a very decided look of determination and decision about Aies' face as she turned out the laboratory lights. She went down to the kitchenette and prepared a little something to

eat. Then she went across to her father's laboratory. There was a ship there, a beautiful thing, with every tiniest brace and protruberance faired into the streamlined hull. The wings were of the newest, variable-pitch design. The propeller of the noiseless type, more highly efficient because it wasted no energy in useless sound.

It was so simple in line and form it was a frozen symphony of speed. To look at it brought the whistle of extreme speed in one's ears. To see it made one rise on one's toes as though to fly. Aies looked at it with a smile and a nod.

Then she went over to Treray's studio. He was reading and sketching on a sheet of paper, a picture of the character described in the book, his favorite pastime.

"Ah, hello, Aies." He rose and went toward her as she looked around the door at him. "Come in. I thought you were working to-night."

"I did, too. But I finished what I had on hand. And I'm feeling jangled. Bruce Randall sticks in my teeth."

Paul laughed. "What's he done now?"

"Nothing," said Aies explosively. "He wouldn't do anything but grin anyway. It's what the commission may do. I know that geologic cross section has been stuck there by the commission. I hate him."

Paul smiled at her. "Now—but how about later?"

"Then I'll hate myself. They'll change me—and that will make life more miserable. You have to live with yourself every second of the day, of the month, of your whole life. And—it makes me crawl to think of it! Loving somebody—and knowing that they decided coldly and scientifically that A and B were a desirable combination, so they took A and made A and B combine. Knowing that somebody decided it was desirable—and made you like it—decided and made you—oh—I can't say what I mean. Two parts of you—one hopelessly and helplessly doing what was scientifically decided you should, and knowing with the rest of you that you didn't decide that at all.

"It makes me crawl. And I'll have to be with myself forever—so far as I know, forever. And know that.

"Well—I won't."

Paul's smooth face looked up suddenly, startled. "Won't! But what can you——"

Her voice was intense. "I won't. And I think I know how I won't, too. Dot Walden is in the statistics and records office, and I'll be able to know—I'll know—and I'll——

"I won't, anyway." She sat silent and tense.

Paul walked over to her, and took her hands in his. "Aies, can I help you any? I think it is hopeless. You can't go elsewhere than in this country without a passport, and in this country the commission's ratings and classifications board would simply act to find you.

"But if I can help you——"

Aies looked at him. A queer little timid look. "You can, Paul—but why, or why, in the name of Heaven did our forefathers ever permit this awful system to start? Why? Why?"

"They were practical—they were scientific!" exploded Paul. "There were more people in insane asylums than in schools. The average man had the intelligence of a good thirteen-year-old. So they turned scientific, and eliminated nature's system of normal choosing—and decided to choose scientifically." He put bitterness and sarcasm into his words.

"They rearranged the world to suit themselves. And they doomed some to live and their children to be the 'hewers of wood and bearers of water' for the rest of the world, with never a chance of having children better than they, because they were scientifically, correctly mated. And they doomed every one

to live and marry as was decided for them. I—I must presently marry some woman I have never seen, never known. Some one who is no more to me than that tree out there. But that is scientific. That is correct. Because I am an artist, and she will be an artist, so our children must be artists.

"Bah—their science will breed art out of the world. Their science has no conception of humanity. It sees it all in terms of A's and B's that will make C's or——

"Hell. Hell on earth. Art is not science. It is above science; it is comprehension without knowing. It is a true result without the logic, the barren, stupid logic.

"Look how stupid those scientists were. We, we of art, drew beautiful forms, forms beautiful in simplicity, and right, eminently right in beauty of line and mass and form. Now, now at last the scientists make similar forms and cackle forth to the world. 'See—see what we have done. We have found the perfect streamline shape.' Years, centuries before them, we knew those forms were perfect.

"Do you know the Golden Mean? It is the ratio of two to three. That is the shape, the ratio for most perfect beauty. Now they have discovered that is the ratio of diameter to length for high-flying, swift ships.

"And they, they try to tell art how to mate for art's best good.

"Aies—Aies—they do not know. Art is above science; it is the comprehension of the whole without the knowing of the parts; it has results, ends without means." His heat of passionate denunciation cooled suddenly to a tenderness, his voice fell to softer tones.

"Aies—I love you—I know you—you are the one for me. They cannot know. They would make you marry some scientist, some heavy, thick-headed, slow-moving scientist. They cannot see the light and the air in you—the swift race of your very thoughts.

"Aies—they are so stupid. They mean so well, and they are so pitiful in their stupidity. Playing with lives, with loves and hates, with things they do not know. Only love can know what love is for.

"Why was I made so to love you, were I not meant to? They are so——" His voice trailed off, his head sank. "So inexorable. I—I am sorry, Aies. I should not say that."

A small, cool hand lifted his face. Aies was smiling down at him, her eyes clear and bright with something that perhaps art comprehended, but it could not find the means to put on canvas, where atoms and protons and strange chromatic groupings must be given the impossible task of translating a radiation to a mere bit of oil.

"I don't want any slow-witted scientist, Paul," said Aies very, very softly. "I don't want any great elephant with a face like the crinkled hide of a hippopotamus, and a grin like a jackal. I want you, Paul. I want you."

SLOWLY Paul rose to his feet. Slowly Aies rose not quite as far—but far enough. He felt solid and hard and supple against her as he held her to him. And Aies was quite sure her plans were right, right in every possible way.

She told him her plan then. It was simple. It was—scientific. It was based on one of the rules science itself laid down. "When theory meets with fact contrary to the theory, then the theory is wrong, not the fact." It was very simple. The theory of eugenic mating could not, by the law, controvert the fact of a marriage already existent.

"We could not hide forever. We could not escape permanently for their board would find us. But that is not necessary. Just a month—two—three. Theory—their theory of eugenics—can-

not break fact. The fact of our love, Paul," she said. "I will hear from Dot Walden hours before they make any active move. And then—dad's plane, so new even the patrol hasn't one—will be able to leave anything and everything. Lost—somewhere among the one hundred and forty-seven millions of people of the United States. They will find us—but not soon." She paused. "And I have one other thing, too." There was a steel of determination in her voice as she said it.

She left soon, for it was growing late. And she went home determined.

She saw Dot Walden that day, and spoke to her, and she did a number of other errands. She was quite busy, and away from the house all that day. And that evening she spent talking and planning with Paul Treray. It was ten thirty when she returned home. And found that Dot Walden was calling her.

"You are right," smiled Dot's image on the screen. "They decided and sent the official decision through this evening. I've been trying to get you since five thirty. By the way—there's something special about it. It's Bruce Randall all right—and congratulations—he certainly is a fine man—but it's special some way. I haven't been in the office very long, and Miss Cartwright was out when it came through. It's on a blue form, instead of the usual white. I don't know what that means——"

Neither did Aies, but she had some faint suspicion. She knew that her father had been questioned by one of the commissioners while he was at the physics association the day before—and she had a suspicion. The suspicion was right. The blue form meant action.

Aies acted, too. She called Paul Treray at once. Her voice was calm, tense actually, and her brain was clear and determined. Treray was ready. In ten minutes his things were ready; in five she joined him, and together, with their light packs, they went toward the shop where the new plane rested. Aies opened the door as Paul stumbled in the darkness. Automatically the gas tubes glowed into light as he crossed the capacitance plate.

Aies' things slipped to the floor in dull surprise. The plane was half dismantled. The powerful motor hung with limp dangling cables from a crane. The propeller lay on the floor to one side. The accumulator stacks were racked in the storage shelves. Her father had spent the day installing the improvement he intended!

Aies' body whipped erect abruptly, her voice suddenly hard and sharp. "By all the laws in existence, and out of existence, I'll break that law if I die trying. Come on!"

In an instant her hat was off, her coat flying, loose and floppy, and grimly she set to work.

It was surprising how much such a really trained woman could accomplish in an hour. By eleven forty-five she had the motor back in place, the prop stepped, and the racks replaced. The accumulators were going in. The plane still looked half-dismantled, but actually lacked only the fairing and the Venturi cowlings, and a little tuning and rebalancing of circuits. Three quarters of an hour would see that done——

"We'd be farther away if we'd taken the standard plane you have," said Paul uncertainly. "There is still so much to be done——"

"We'd have been grounded before we left town," snapped Aies. "Give me that secondary accumulator bank there." She snapped it into place, put the nut on the bolt, and over the whir of the electric wrench added, "I'll bet dollars to a stripped bolt they've got a blanket order out to the patrol to ground me. And probably that darned Bruce Randall, too. I just know I'm right in guessing what the blue form means and——"

THE WHIR of the wrench stopped. But the whirling sound didn't; it kept on, slightly heavier in tone, and growing louder. Aies snapped erect, brushed a streak of grease across her forehead, and a stray hair out of her eyes.

"Paul—the patrol. Yes, we'd have been grounded." She was busy wiping face and hands on clean waste. Then she slipped the accumulator block of her new projector into her pocket, slipped the lead up her sleeve, and a rubber band held it in place. The projector was almost hidden in her folded hand as she stepped to the door. The patrol plane was just settling softly to the grass court. Paul stepped back out of sight into the shop.

"Hello—what of interest brings you here?" asked Aies as she stepped out, smiling.

A broadly smiling patrolman leaned out of his window. "You an' Dan Cupid, I guess, sweetheart. With the sanction and suggestion of the commission. Will you take a bit of a ride along with me?"

Aies started back a step. "The commission—to-night? There—there must be some mistake. Why—I haven't received any notice—I—I'm not ready at all—— I can't go to-night!"

The patrolman looked puzzled, looked at his order form, then smiled at her again. "It does sound screwy, but unless you have somebody else's face by mistake, I guess I'll have to take you along back. The order's kinda plain, honey."

"But—but I just can't——"

"Well, why not come along and tell 'em about it. I just ain't a commissioner and I can't do a darned thing about orders except carry them through. Step in and come along, won't you?" The patrolman was getting confused and worried.

Aies wasn't. She stepped into the plane. "Oh, Paul!" she called a moment later. "Paul, come and help me get them out, will you?" Paul stepped into the plane, and lifted the first of the two men out, grinning down at him.

"So," he laughed, "and are you comfortable?" He laid the patrolman out on the lawn, carefully. The man's angry, startled eyes followed him. Faint twitchings of jaw and lips told of his efforts to speak. But only a low, gurgling sound came from his throat. A moment later the second man joined the first, and thirty seconds later they watched as the SPX-234 rose gently from the field and started up. It hung for a moment, and Aies leaned out, smiling.

"Sorry, fellows. It's just a paralyzer, and you ought to be quite O. K. in about ten minutes. I'll have to be going along now." She turned back to her companion, and faintly the man on the ground heard her ask: "You've got the Boston charts, Paul?"

Then the ship rose out of sight and drifted off at the leisurely fifty miles an hour of the patrol ships in a city area.

"She mis—cal—culated," said a jerky, rasping, almost unintelligible voice from Patrolman Larry Mallory. "I can—wiggle my toe." His voice cleared up rapidly, and in scarcely three minutes he was able to roll a little, and he started for the still-lighted shop. There would be a communicator there. Halfway there he got to his hands and knees, and weakly crawled a few feet, then staggered to his feet, and as though thoroughly drunk, rolled and swayed to the telephone in the shop.

"Ptrool 'edquart, quick," he said as the hum of the operator's 'connection came on. Ten seconds later the desk captain responded.

"Ptrolman Mulry," he said thickly. "Th gurl—Merlin—gadget knocked us—stiff. Tooka shup—oo-tree-fir—spota numbers easy."

"Mallory? Mallory! You're drunk. Report here at once!" snapped the captain. "Where's O'Halley?"

"Cap'n, rrrn't 'runk—pralyzed. Gil 'da wepun. Somepin knocked us stiff. Olley's cummin. She stole the ship, sir. Thank goodness I can talk again. The girl had something or other that knocked us stiff—a ray of some kind—couldn't wiggle a toe for a while, then slowly recovered. Honest, captain, we're not drunk, and she's got our ship."

"You're soused," snapped the captain. "I'm sending a man out there at once. Stay where you are, and consider yourselves under arrest."

"Yes, sir," said Mallory, dolefully. "He don't believe us, O'Halley," he said, turning to his companion. "He thinks we're drunk."

"Well, we ain't. But the damn girl got the ship."

A patrol ship, siren screaming, settled swiftly down five minutes later, and picked them up. They were bundled unceremoniously into the back, with the evident anger of the two patrolmen in the ship, ashamed that a brother patrolman should get drunk on duty.

Five minutes later, the ship landed on the headquarter's roof and the two men were taken below. "Take them in to Commissioner Stracey," ordered the desk captain. "He wants to interview them."

THE TWO MEN were escorted down the corridor, through the connecting bridge to the conditioning building. Commissioner Stracey's office was somewhat crowded. Dr. Harrison, head of the department, and a young, powerfully-built man with an unusually blank face already filled the small office.

"What's this you reported about Miss Marlan?" demanded Stracey, as they entered.

"She had some kind of a weapon, sir, that throws a paralyzing beam. It made us helpless instantly—conscious, but unable to move or even speak."

"The paralyzer—I thought she'd use it," said the young man, chuckling. "They haven't any defense, and I'll bet she gets away."

Stracey looked at him, sharply. Then he looked at Harrison. "What's this?" he demanded.

"Primary state," smiled Harrison. "I brought him in here as I said because he confirmed the Primary statements of her father and added some interesting statements. He mentioned the paralyzer."

"Just what is the Primary state? How much can it be trusted? Is his mind clear?"

"In the Primary state he merely thinks out loud. His mind is perfectly clear, and normal, save that the censor of the brain is out of the circuit, and the memory tracks are out. He cannot censor his thoughts, and he cannot remember what he says. It corresponds to the Secondary state used in criminal proceedings. There the suspects speaks his thoughts, but memory is associated so that he remembers and knows, when waked, that he has convicted or freed himself.

"Here, while his mental processes are normal, he can neither remember nor censor his thoughts."

"Then Miss Marlan had a paralyzer?"

"Had a paralyzer?" Bruce Randall chuckled. To him, it seemed he was chuckling and thinking to himself. "Oh, she had one—a little honey. Only she didn't develop any protection. She'll have lots of fun when she tries it on me."

"Why?"

"Because I did develop protection. I know just how delightfully mad she'll be when she tries to paralyze me and the cloak stops the rays. Then—I think my tube will be powerful enough—probably more powerful than hers."

"She definitely has a paralyzer?"

"She certainly has! She's been playing with it for months. It's a great invention—extremely useful for the patrol when they finally get it—quell disturb-

"Lay him here. Hurry! We have until the patrol finds them. After that?"

ances instantly. Harmless, but effective. They'll have a fine time catching her. They won't believe she can do it. They'll think the men are drunk."

"She said she had one, sir, and the captain did think we were drunk," interrupted Mallory. "And she said she was headed north. You'd better have the patrol strengthened there—said to the man with her: 'Have you got the Boston charts?' I think she didn't know we could hear."

"Probably thought she was out of earshot—maybe realized—no, she intended him to hear her. She knew her weapon," said Bruce. He chuckled. "She'll probably—hmmm." Bruce fell silent.

"Send orders to withdraw three of the ships from the north sector and reenforce the west and south sectors," ordered the commissioner after a few seconds. "The little fox."

"Where is this protection you have?" he asked, turning to Bruce.

"The cloak," said Bruce. "The cloak in my laboratory. They'll probably never catch her. If she can make it—let her. I won't interfere, and the patrol probably won't get her."

Stracey looked at him in puzzlement, then smiled. "Peculiar statement, eh, doctor. I wonder why he doesn't want to help? Doesn't he like the girl?"

"She's wonderful," said Bruce softly. "She's as clever as any woman that ever lived, and the way she looks at me—— I love her. The way she turns her back—that's almost all that I have seen—most of the time." He smiled tenderly.

"There's your answer to the last question, commissioner," smiled the doctor. "He wants to play fair, I suspect. Feels it isn't right to aid in hunting her down."

"It wouldn't be fair; she's fighting enough already—it's her fight, and the little thing may win, too," sighed Bruce.

"Mallory, I guess you're right. Release him, men. I think you two can realize that we did have reason to think you drunk. You really can't blame us for the mistake. But now, the pair of you go up to that laboratory and see if you can find those cloaks."

"Silvery-gray cloaks—in the cabinet —— I hope they don't find them," said Randall. "I have the key—they won't want to break in."

Stracey looked from Bruce to the doctor. "Harrison, do you think he would give us the key?"

Harrison looked at the powerful young man and smiled. "You might get a half dozen good husky patrolmen in here, and possibly they could get it. But just because he must speak his thoughts doesn't mean he'll give up those keys at all. He thinks he's sitting here silently."

"Then take some pick locks and open it. I wonder if it will be safe—or will they run into some dangerous stuff?"

"There's nothing dangerous—they'll probably forget the accumulators—the whole secret——"

"Don't," smiled Stracey, looking at Mallory. Mallory was looking at Randall uneasily, shifting his weight on his feet.

"No, sir," replied the patrolman. "Shall we go?"

"Yes, go ahead."

"SHE'S going to Boston," said Randall, suddenly. "She meant the patrolman to hear her, knew that they'd expect her to go anywhere but to Boston, since they knew she knew they had heard. So she would go to Boston, because the patrol would not expect her there."

"What?" gasped Stracey. "Whew—do you think she—I mean—is he right?" asked Stracey, looking at Harrison.

"She's a very clever girl, evidently," said the doctor, thoughtfully, "and just an abstruse line of reasoning might occur to her."

"I know her. I know she will do

that. They will probably miss her, unless by blind chance she runs into the few planes in that sector."

"Commissioner——" the desk captain's voice came from the small speaker under the table. "We've just gotten a report from the north field that ship XP-47 came in on automatic controls, with the two pilots completely drunk. I think the girl was paralyzing them. They—further report. They say that they saw the 234 and were suddenly knocked out, made helpless, while their ship went into a power dive, exceeded the 500-mile limit, and the automatics took over and landed them safely."

"She went toward Boston," nodded Randall. "Tough luck. She hit one of the planes. I wonder what she'll do now. She's beyond any of the planes of the New York patrol now, and her ship was just as speedy as any other patrol plane. Dr. Marlan's plane was disassembled, of course, so no one can catch her. Ah—the accumulators. Patrol planes have undersize accumulator banks to make theft of them difficult. I wonder if the banks were well charged?"

"They were half full," said O'Halley, goggling at the young physicist.

"Then they carried a charge good for only 150 miles or so at cruising speed, not more than 200 absolute maximum, and 100 at high speed. She'll have to rent a plane. But if she goes into the city, she'll be spotted because of the patrol plane. If she lands outside, it will take hours to get in a large city, and —she'll go to a medium-sized city. Too small—they'd notice and report. There wouldn't be a plane-rental agency.

"Too big—the patrol would be too active."

"What city will she stop at? New Haven—New London?" asked Stracey tensely. It was like asking a thinking machine. Immediately the mechanism started on the new problem.

"No. By no means. She'll circle New York and head south now, because she's beyond the reach of the New York patrol and free to go in any direction. They'll expect her to put the most possible distance between herself and New York. That would be by going due north. So she'll circle to an unexpected quadrant. Probably due south. Newark—too large. Suburbs are solid clear out, too. She won't go there. Elizabeth—too large. Too much part of Newark. Ah——Amboy—one of the Amboys. Perth Amboy—South Amboy——"

"Commissioner—Mallory reports he can't find the cloaks Randall described. Are you sure he isn't bats? Mallory claims his laboratory has no cabinet or locker of any kind that isn't open and full of just plain junk. He's afraid to paw around much."

"They can't find the cabinet," Randall chuckled. "It's hidden. He mustn't paw around. A worried frown came over Randall's face, and for a moment a different, intelligent look appeared on his face; the lines about his eyes and mouth, the lines of character and thought and intelligence, grew firm again.

He spoke with a deeper, more pleasant voice. "Commissioner Stracey, I'd advise that any one looking about in our laboratories be very careful as there is a great deal of dangerously charged apparatus." Then as suddenly as it had come, his face lapsed again into placid thought.

"He means that, commissioner. It probably is dangerous," said Harrison. Stracey spoke into his communicator, and relayed the warning to Mallory.

"But how are we to find the hidden cabinet?"

Harrison chuckled. "That's locked up in memory. It's probably between memory and censor sections. We can't, that's all. He'll have to hunt. Get some of the patrol technicians out there with

apparatus. If we wake him, so that memory is available he won't want to tell us, and the censor is on the job. Too bad—but we can't do it with him. A low-class or unbalanced mind we could handle, but remember, it was only with his consent and aid that I was able to get him to the Primary state. He would object a second time, right now—and that would be that.

"Hmmmm—that will take time. Then you'd better order the patrol in the Amboy region to picket all rental-plane agencies, and watch out for her paralysis device."

"They won't believe it, although it comes as an order, so that's all right," said Randall complacently. Stracey turned red, then roared in laughter.

"By gosh, he's right! They won't. They'll get knocked over like a row of tin soldiers. But it's all we can do. What will they do then?"

"It depends on the color of the plane they take," said Bruce thoughtfully. If it's gray, or black, or dark brown, that's one thing. But if it's bright red, or bright blue or a bright color of any sort, why that will mean something else."

AIES looked at the lights below, and pondered. Then she looked back at the chart. "That's Perth Amboy, all right, Paul," she sighed at length. "The motors are getting weak, so we'll have to land pretty quickly. It's 1 a. m. so we'd better land away from houses. It'll be a two-mile hike. But then—walking is good for one." She laughed softly. "I'll bet they're burning up the night between New York and Boston about now."

They left their things in the plane, when it grounded gently with almost the last gasp of the accumulators, and walked. It had started to fog over, a heavy wet fog, and Aies feared for her not-too-perfect little weapon's insulation. They walked rapidly toward the outskirts of the city and stopped at a lighted drug store. In a classified directory they located the largest plane-renting establishment in town, took the tube to the nearest station, and walked to the office. White light made a vague, slanting, rectangular shaft in the mist as they turned in.

Aies stopped in dismay. Four large patrolmen started up at her entrance; two more appeared just outside the door almost instantly.

Six large patrolmen and two company clerks sat sleeping in their chairs two minutes later when a customer walked in. Thirty seconds later he, too, was sleeping in a chair. Aies passed the beam over her nine victims once more for surety, and then carefully filled out a rental blank, put the deposit on the table, and wrote "Boston" as her destination. Then she and Paul walked back into the hangar. "The red one there, Paul," she said thoughtfully. "It's a Crossing—fast."

"But Aies—it's red—so conspicuous," objected Treray.

"That's what I want," laughed the girl. "They'll look hard for it. Come on, and I'll explain, sweetheart."

The plane rose gracefully as Aies made sure the accumulators were fully charged. Then laughingly she explained her plan. The plane had scarcely left the city when Patrolman Sargeant knocked the telephone off the table with a slightly mobile hand. "Red," he croaked. "Get-part—'ell 'em—red. 'rite red."

"Bright red," said Aies, looking at the plane. "They'll be looking all over for it and stopping all the bright-red planes in the air to-night with a man and a girl in them. While this particular bright-red plane rests peacefully in a deserted shack some three and a half miles from its starting point. Now for the rest of the hike." She looked out. The heavy, wet mist still hung low,

scarcely ten feet deep. It was clear here, but half a mile away it hung like a dreary blanket. It'll be wet. Brr——"

It was near dawn when they reached the Elizabeth tube entrance. Five minutes later they alighted at 200 Street, in upper New York. "Naturally," Aies had said, "they don't expect to find us in the heart of things after that escape."

They took the moving walk on the second level downtown, then shuttled across town, and took a subway to the 33rd-Street terminal. The crowds were getting thicker once more, and they melted into it; then the most exposed part of the trip began. They took the moving walk over to Brooklyn. The other walk was crowded, but very few people were going this way. Aies saw suddenly in the dim, cold dawn light two patrolmen in the familiar capes. Paul felt her stiffen against him and looked at the pair himself, wide-eyed.

The patrolmen cast a casual glance at the pair and turned away. "Uhmmm —— " Aies sighed in relief. Her voice was somewhat shaken as she went on. "That's one difficulty—every blue uniform will mean a man staring at us. It won't be much fun for the next few months."

The walk carried them on, off the bridge and to the Brooklyn terminal. They were nearing it when Aies saw two rather peculiar figures. They wore the blue uniforms, but over their uniforms they wore a nonstandard cape. Aies frowned in puzzlement. Somewhere she had seen that dirty-gray cloth—stiffish cloth.

Suddenly she stiffened. The two were looking directly at them, two elderly men with kindly, paternal smiles. They looked at her reprovingly. Jerkily, Aies raised her arm. In the dim light the little tube glowed brightly, a faint beam reached out.

The men did not fall. Their cloaks were washed with a softly wavering light, violet, and their expressions were as a father might look down at the angry child pounding at his legs. Aies felt the little tube grow hot in her hand, it began to sputter. With a soft *pouf* it collapsed into darkness.

Wide-eyed, Aies looked down at it, then in wonder, hurt surprise she looked up at the two men. One raised his hand, and something glowed softly. A greenish-blue light. Aies felt a sudden tingling through her muscles, a rapid weakening. And suddenly she recognized the material. "Bruce—stuff he—worked——"

She'd remembered that peculiar gray stuff, hard to recognize under this light. Then her lips wouldn't work any more, and she was picked up gently by two of the men as two more appeared to pick up Paul. She saw quite clearly that Bruce had been watching her experiment rather quietly and had not only duplicated her paralyzing device—but had gone her just one, slight step better. He'd rigged a protective device.

And she was quite furious that Bruce had spied on her, and beaten her, and helped catch her. But she couldn't wiggle her little finger when they brought her into the conditioning laboratory.

BRUCE looked across at Stracey, half embarrassed, half annoyed. "It wasn't exactly fair, sir. It isn't usual to make a man help as I did."

"Help capture his runaway fiancée?" chuckled Stracey. "Well, nowadays we aren't used to chasing the aforementioned fiancée. And I don't know that we could have kept ahead of her without your very valuable assistance. The bit of reasoning on the color of the plane was most interesting."

"Thanks—I don't remember it," said Randall sourly. "Tell me so I can enjoy my brilliance."

Stracey laughed. "Try going up to room 73. That may be more enjoy-

able." He handed Bruce a pass, and Randall rose hastily.

"Thank you, sir," he said and was gone.

AIES rose with a smile as Bruce came into her room. There was a half-pout half-smile on her lips and a golden-red halo of sunlight shining through the window that formed a frame for her head.

"Hell, Bruce. I hear you helped capture me?" she stated.

"So I heard—when they were quite through with me," answered Bruce. His eyes crinkled very slowly, and the crinkles spread down his cheeks till the corners of his mouth twitched.

Aies looked at him for a moment, and slowly a little smile of surprise and tenderness came over her face. "Funny, I never liked the way you smiled—but now—I think it's—awfully nice to have around."

"It isn't funny," said Bruce, tenderly. "It's natural. They changed you a little, dear girl. You're supposed to love me now, you know."

She looked up at him slowly. "It is funny—because I think I do. In fact—I'm sure I do, Bruce." She came toward him slowly, and he put his arms around her very gently.

"You'll break. I know you'll break in two. You're very small."

"Uhmmm——" said Aies. "I'm not—but you are nicely large." She looked up at him. Her eyes changed for a moment; a doubt seemed to creep into them. "I suppose they made me feel that way. I suppose I don't really do——"

Bruce looked down into her eyes. "Does it matter, dear? Does it matter in the least? All we seek in life is happiness. Happiness—peace—and it matters not one iota how we reach them. Love is the greatest happiness in the world—isn't it, little sweetheart?—and so if it is, does it matter whence it comes or why? Does it matter if it is because some one else thought it wise or because we developed it by association and contacts that were pleasant?

"Perhaps—perhaps it does. Because love can be real—and not last. It must wear, and only similar characters, similar ideals, similar ideas can make it. And wisdom can help there, when the heart is not very wise. Unfortunately, till men learned the secret of conditioning, the head could not rule the heart. Does it matter, now that the love is, when it came?"

"No," said Aies, and stopped further discussion.

Then at last we saw it. A wonder which would have held us spellbound, except that——

The Whisperers

by Donald Wandrei

IT IS doubtful whether anything in the annals of medicine or the history of mankind made a deeper impression than "The Whisperers," though there may have been deadlier diseases or more repulsive scourges in the far past. Great plagues swept Europe in the Middle Ages and depopulated whole countries. They ran their virulent course through months or

years, claimed millions of lives, and left an indelible memory in such writings as Defoe's "Journal of the Plague Year" and Boccaccio's introduction to the "Decameron."

Bubonic plague, yellow fever, malaria, typhus, and other epidemic diseases have raced with a fury more destructive than war through the Far East and the tropics, through civilized peoples and savages, during ancient times and modern. Appalling though these pestilences were, they lacked the peculiarly frightening quality that distinguished The Whisperers.

In the fabulous years of Atlantis, or the prehistoric existence of Mu, it is possible that some now-forgotten malady imperiled the race. It is even possible that in the dawn of time, the priests of Lemuria, in an effort to preserve their continent from impending doom, consulted the Archaeotic Symbols, those mysterious petroglyphs which are said to have summarized all conceivable life forms.

It is within the limits of credence that some weird fate may have overwhelmed Mayan culture, or brought oblivion to the race whose existence is known only by the sculptures on Easter Island. But history affords no parallel to The Whisperers; and neither history nor legend presents more than the vague speculation that any affliction as strange as The Whisperers ever before entered human life.

Historians writing in this, the Twenty-first Century, can recall the appearance of The Whisperers with greater understanding but no less alarm than the general public. The scientists of the Twentieth Century had made vast strides toward extending the boundaries of knowledge, and toward solving the ultimate secrets of space, matter, and life. Their theoretical and experimental work was disseminated through the press, but doubtless received less attention than sensational murders or economic conditions. Scientists were prepared to investigate, analyze, and combat the mystery of The Whisperers; but in this case, the explanation caused as much alarm as The Whisperers themselves.

Not that we know the whole truth yet. Parts are still missing. But it is a probability that we may some day know more about the nature and origin of The Whisperers, for the outposts of knowledge are constantly being pushed farther, and the cosmos made to yield up one by one its deeper riddles. In the absence of complete data, however, we can only speculate as to the truth, while accepting the best explanation that scientists have advanced.

The first item concerning The Whisperers to be published was a short news dispatch sent out by the Soviet government from Moscow. The item was not used by the majority of newspapers in Europe and America. Those that did print it treated it either as a curiosity or an inside filler.

> Moscow, April 2—Villagers of Kutsk, a trading post in northern Siberia, recently witnessed the fall of a glowing object from the sky, according to delayed reports which have just reached civilization. Investigation disclosed the object on the outskirts of the village in a small area of newly melted snow and ice. The object proved to be an ovoid of greenish metal a foot long and shaped somewhat like a toy Zeppelin.
>
> Unable to find an opening, but discovering by tapping that it was hollow, the villagers smashed the object. This is said to have been done with great difficulty owing to the toughness of the peculiar metal. The inside was completely filled with a jellylike substance. Most of this was iridescent and evil-smelling, but part was reddish-gray and odorless. Government chemists will analyze the substance in an effort to determine whether foreign powers or reactionary interests within the party have been experimenting with new war devices.

The item was followed a day later

by an additional bulletin which, though briefer, received wider publication.

> Moscow, April 3—The small metal object that was yesterday reported to have fallen in Kutsk, Siberia, is the source of a further mystery according to word now received. The reddish-gray substance that filled part of the object is said to make a low sound which is barely within the range of audibility. The smashed container and contents are now on the way to Moscow for chemical analysis.

In the early days of the Soviet régime, even such scant information as this would have been rigidly censored. Fortunately for civilization, time and experience had modified many of the Soviet's principles. In the Twenty-first Century, her scientists gave close cooperation to scientists in other lands, and news of all kinds, including unfavorable reports, was issued as rapidly as available.

The third bulletin, issued two days later, won fairly general publication, but rather for its oddity than for any disturbing quality it contained.

> Moscow, April 4—A medical mystery has just been reported in Kutsk, the Siberian village where a strange metal object was recently found. One of the villagers, Serge Aleighieff, by an odd coincidence the very man who found the object, has been stricken by fever. His body gives off a low, murmuring sound that is distinctly audible. Observers declare the sound to have no connection with his vocal cords, and that trickery is impossible.
>
> The villagers regard M. Aleighieff as having supernatural powers. They put up a strenuous resistance when an airplane was sent from Zelingrad, the nearest town with facilities, to take the man to the hospital there.
>
> Physicians here are much interested in the case. M. Vilanov, commissar of public health, states that he has never heard of a similar case and believes it to be unique in medical history.

THE NEXT bulletin again resorted to brevity, and simply stated that the metal object and contents reached Moscow by airplane, but that the jellylike substance, contrary to earlier reports, was of a uniformly iridescent and malodorous nature. None of the stuff had a reddish-gray color. It was not disclosed whether some of the material had been lost in transit, whether the first report was inaccurate, or whether exposure to air had reduced it to a single state.

A separate paragraph declared that Aleighieff had reached Zelingrad, and that hospital attachés were mystified by the symptoms of his illness. No explanation had yet been advanced for the whispering sound that emanated from his flesh.

The report that really made the headlines and began to attract widespread attention was the following announcement:

> Moscow, April 8—The U. S. S. R. today declared a state of extreme emergency to exist in the Siberian village of Kutsk and summarily executed the entire population of 230 men, women, and children. This drastic step was taken for the benefit of the public and only after careful investigation. No visitors are allowed to approach within ten kilometers of the village, under penalty of instant execution by the rules of martial law.
>
> A total of 64 other individuals have been seized in Zelingrad and Moscow and placed in absolute isolation under military guard.
>
> The reasons given for these extraordinary measures are based on the finding of a small metal object shaped like a projectile near Kutsk several days ago. The object was taken to Zelingrad and transshipped to Moscow. A second airplane departed for Kutsk and flew back with Serge Aleighieff for hospitalization. M. Aleighieff had contracted a hitherto unknown fever that caused his entire body to give off a murmuring sound. The aviator who flew the victim to Zelingrad reported that every individual in Kutsk emitted the same puzzling substance, and that hysteria had seized the populace.
>
> Aleighieff was admitted to the hospital at Zelingrad but died within a few hours. Until the end, his body was the source of

a singular rustling sound not unlike the movement of a swarm of maggots, but without visible cause. At death, his body rapidly passed from the fever flush which had reddened it and changed to an iridescent play of colors accompanied by a foul odor before putrefaction had begun. The whispering sound persisted but gradually became fainter and was no longer audible several hours after death.

A scouting plane, instantly ordered to Kutsk, sent a radio report that the streets of the village were strewn with dead, and that the remainder of the population suffered from the whispering fever. As a matter of public welfare, airplanes loaded with lethal gases were immediately dispatched to the scene. The epidemic is considered more remarkable because of the latter cold weather, temperatures of 40 to 60 degrees below zero having prevailed in the district for the past week.

Aleighieff was the first person to find, handle, and open the metal object that fell on the outskirts of the village. Authorities are convinced that a definite connection exists between the object and the outbreak of the malady. This view is supported by the fact that several nurses, interns, and surgeons at the Zelingrad Hospital who treated the patient have developed both the fever and the whispering.

A general order was then issued for the military police to detain and isolate but avoid contact with all persons who had any direct or indirect part whatsoever in the handling of the metal object or of Aleighieff.

Public health and military officials are cooperating to control the situation. Grave suspicion is entertained that disease microbes of a new and malignant kind were deliberately loosed by a foreign power, and that only an accident caused the carrier to fall in a sparsely populated area.

All workers are requested to keep a vigilant watch for additional projectiles, but to avoid direct contact with any that may be found and to report them immediately.

Meanwhile, the intelligence division of the military police has been given the sterilized container for inspection to determine its chemistry and origin. Metallurgists, chemists and other technical experts have also been detailed to analyze the metal.

M. Vlasov, in a preliminary report before his detention and isolation, declared that he had found no trace of bacteria in the iridescent substance. He advanced the theory that it may be a toxic poison capable of being absorbed through the skin and of creating further body toxins communicable to other persons through skin contact.

Thus far, the exact nature of the substance is unknown, and the parts of the greenish container have puzzled experts. It is expected that further analysis will disclose the unidentified metal to be an alloy of the tungsten-chromium-cobalt group.

There is no cause for alarm and the U. S. S. R. announces that the situation is well in hand. The prompt measures taken effectively checked the outbreak. The general warning was issued purely as a precautionary measure, to facilitate the swift destruction of any further projectiles that may be found.

Subsequent developments made the last paragraph seem ironic. From then on, the dispatches were longer and more ominous. Day by day, the headlines grew in prominence and larger space was devoted to The Whisperers. They passed from a filler to a "must," advanced from inside columns to a front-page box, expanded from a box to a half column, rose to a number three and a number two head, earned a seven-column streamer, crowded more and more other news off the front page.

THE WHISPERERS reduced flood and legislation, national and local events to insignificance. They made the records of murder trials dull reading. They sent practically all other news into the waste-basket. In six days, The Whisperers leaped from oblivion to the international limelight. In ten days, they advanced from single-deck to four-deck streamers on even the most conservative papers. They were news. They were the only news that mattered.

Through the entire duration of The Whisperers, two brilliant young American scientists played a leading part. These two men have since become famous, but at the time they were com-

paratively obscure. Dr. A. E. Chard at thirty was already achieving notice in medical circles as an outstanding diagnostician with a specialized interest in infectious diseases. Warren E. Langley, Sc.D., at thirty-five was drawing a fat salary from the Optical Instrument Supply Co. for research work in the field of photomicrography.

These two men were intimately connected with the history of The Whisperers, but worked behind the scenes in their own quiet way. Their names were seldom mentioned and did not make the headlines until the latter phases of the epidemic.

By that time so many theories had been offered, so many remedies suggested, so many accredited scientists fallen by the wayside along with the usual number of cranks and quacks that the proposals of Langley and Chard, while welcomed as any ray of light was, met with a considerable degree of skepticism.

The two scientists obtained their first association with The Whisperers when Chard walked into the O. I. S. Co.'s laboratories late on the afternoon of April 6th to see Langley. They had known each other for a number of years and saw each other frequently. A close friendship had developed because each had a vital interest in the other's field. Chard was attempting to isolate and classify the filterable viruses, those bacteria so tiny that they pass through the finest porcelain filters. Most of all, Chard hoped that some one would perfect the equipment to see and photograph the viruses. Langley was exactly the man, for Langley was experimenting with lenses and methods for ever higher magnifications.

The physician found Langley tinkering with a hopelessly elaborate mechanism of slides, focal beams, interferometers, interference refractometers, coils, amplifiers, prisms, projection beams, microspectroscopes, micrometric electrical devices, and other parts.

The physicist glanced up. "Hello, Chard, what's the news?"

"Not much, except that they've captured a whispering man somewhere in Russia."

"A whispering man? What's news about that?"

Chard shrugged. "He's supposed to have a fever that makes his body give off a whispering sound, but it's probably just some reporter's imagination getting the best of him. What's new in superphotomicrography?"

Langley frowned wearily. "Very little, if anything. We haven't been able to obtain magnifications of much more than 10,000 diameters."

"And how high will you have to go to make filterable viruses visible?"

"At least 1,000,000, if not more," Langley replied. "It will be no small feat to accomplish. If we could raise the power to 1,000,000,000, we might be able to get at the heart of the riddles of energy and matter. We might even see what an electron looks like, or the point at which energy becomes matter. We could open up new worlds that are scarcely dreamed of. The trouble is that when magnification exceeds 10,000 diameters, the true image acquires such distortions from atmospheric interference and from the limitations of optical instruments as to be worthless for serious study. I don't think that lenses alone will ever solve the problem."

Chard looked at the complicated mechanism beside Langley. "How will it be solved?"

"I don't know yet, but possibly by the use of microscopic photo-electric cells and the conversion of one form of energy into another form. Sound can be converted into electric impulses and reconverted into sound as in the telephone, and then amplified to almost any degree. There is no theoretical reason

why the same process couldn't be used on micro-organisms.

"What I am trying to do is to reflect an infinitesimal beam of light from a micro-organism, thus throwing its image on a minute photo-electric cell of extremely delicate sensitivity. The various light values of the image will then be converted to electric values of micromillimetric intensity, whose current probably won't exceed .000000001 to .00001 of an ampere."

"The next step will be the amplification of this current and then reconversion of the electric values to light values directly upon a photoscreen or projected upon the ordinary cloth screen. It's a terrifically difficult problem all in all, because the measurements are so microscopic and the conversions must be absolutely accurate, without loss or distortion."

Langley, if anything, understated the difficulties of the problem. For a few minutes, Chard silently watched the other man tinker with his invention before continuing on his way. Langley by then was so absorbed in the complex creation that he did not notice Chard's departure.

The doctor had put in a hard afternoon's work at a free clinic, but he toiled till late at night on his researches into the realm of the filterable viruses. Chard had no more conception of what one of these submicroscopic organisms looked like than any one else did. He could, however, pursue certain lines of investigation with practical results.

Experimentation with drugs and chemicals, toxins and antitoxins, frequently led to valuable discoveries in controlling or counteracting the ravages of filterable viruses. Such successes did not in the least satisfy him. He never would be satisfied until he could see and describe one of these micro-organisms, and until he could watch them in the midst of their deadly work.

To most people, the coming of The Whisperers was a catastrophe of such unparalleled importance that it drove every other thought from their minds. To Chard and Langley, among a mere handful of men throughout the world, The Whisperers served as a tremendous stimulus to the activity which they were already pursuing.

THE CONFIDENT prediction of the Soviet government had been premature. It was being tragically refuted at the very instant that it flashed to other parts of the globe. The Whisperers had not been halted. Isolation had proved a failure. In one respect, the fears of the government proved correct: every individual who had been isolated contracted the whispering fever. But so did countless individuals who had been in the vicinity of the sufferers. And not only the prisoners, but their guards, and the military police who had made the arrests, and friends or unwary strangers, walked to the accompaniment of an appalling whisper within a day.

On April 8th, 64 new cases developed, chiefly in Moscow and Zelingrad. These victims were detained as a precautionary measure. On April 9th, over 600 additional cases made their appearance in Moscow alone. On April 10th, the number leaped to more than 10,000, with new cases developing in such vast numbers that hospitals, physicians, and undertakers were swamped. By April 11th there were 300,000 patients in Moscow, and there was no longer any attempt to bury the dead. They littered the streets, and were left there, for evacuation of the capital had been going on for two days by the terror-driven populace, and the universal thought was flight from this dreadful scourge.

The inconceivable rapidity with which the malady spread and the terrifying whisper that marked its inception were but two of the factors that created

panic. The malady itself was comparatively painless and devoid of those excruciating symptoms that had made previous plagues agonizing. The main characteristics were the fever, followed by a prickling sensation over the entire body, then a gradual feeling of drowsiness, then the end, suddenly and without warning. The malady ran its course in two days or less.

Doctors were helpless to combat it because they caught it and died before they had an opportunity to analyze blood specimens. Extraordinary hemorrhages accompanied death—hemorrhages of the brain, the internal organs, the arterial system, as if the lining of every cell and the walls of every gland, organ, and artery suddenly dissolved. Death seemed horrible because of the lovely colors that rippled in iridescent mockery over the skins of the corpses.

To the living, the most horrible aspect of The Whisperers was the low, murmurous sound that marked the incubation of the plague. That sound, like the voice of death, as if the maggots were already swarming in the flesh that was soon to be theirs, drove hundreds of patients to suicide and brought raving madness to others. There was no escape from it. It sounded from homes and clung like an invisible presence to crowds. It filled the air with a monotonous and mournful sound.

By airplane and stratoplane, by car, train, bus, or any other available vehicle, the refugees streamed from the city. They poured out in all stages of dress, abandoning houses and property, deserting machines, work, everything in the urgency of departure. The situation had got utterly beyond control, as the government admitted in its early frantic appeals for assistance. After the first few days, however, there was no government left. The officials had precipitately scattered to all points of the compass.

The main response of neighboring nations was a vain effort to close their frontiers as if that desperate action would miraculously halt the progress of the plague. The thunder of guns sounded from the Black Sea to the Baltic, and airplanes and stratoplanes flamed from the skies like showers from exploding rockets. The staccato of machine guns and the crackle of electric barrages roared along the frontiers. The dead accumulated in heaps until ammunition ran out, and still the refugees swarmed on by land and sea and sky. The laws of chance alone would have enabled a few lucky stragglers to penetrate the deadliest barriers ever devised by man in years of preparation. Here there had been no time for careful planning; and while the speed of modern communication permitted swift, concentrated mobilization, that same speed broadcast the messengers of death.

PERHAPS if the projectile had fallen in the old days on the spot where it was found, if it had fallen in the Nineteenth Century, it might have wiped out Kutsk and spread no farther. Kutsk was more than three hundred miles from Zelingrad. But the projectile fell in the Twenty-first Century, and the marvelous speed of modern communication that every one praised was the real menace which gave the apparent menace of the whispering fever a pyramiding and accelerating velocity.

The pilot who brought Aleighieff to Zelingrad had chatted with fellow pilots at the landing field. He was one of the 64 persons detained, but during his isolation, those fellow pilots of the Siberian air lines were winging their way to the Far East, and southward to India, and westward to Moscow, and toward many points of the compass.

When the Soviet government issued its first warning, superstitious Chinese were fleeing from a merchant through whose body devils had begun to speak

in Hankow. While the acrid fumes of burned powder were accompanying thunderous, earth-shaking explosions and the slaughter of refugees along the Russian border, the excitable citizens of Paris were listening in puzzled silence to a man seated at a sidewalk café whose body gave off a curious vibration like the hum of distant conversation.

More disastrous than any war ever fought, more deadly than any pestilence of history, instantly contagious and sweeping with a speed that paced the word of their coming, The Whisperers advanced. Contact with a victim seemed unnecessary to contract the fever. Mere presence in his general vicinity appeared to be all that was required. Then the progress was mathematical. A dozen friends or chance observers caught the plague from the original victim. Each of that dozen, before the whispering became audible, and frequently before he was aware that the dread scourge lodged within him, passed it on to a dozen others. And still no one knew the nature of The Whisperers, or the cause of that mysterious whispering, or how it could spread with such terrifying rapidity.

During the most virulent and malignant phase of previous pestilences, when they raged at their worst, there was always a percentage of people who proved immune to the disease or who survived its effects. There had been no such exceptions in the case of the whispering fever.

No one proved immune. Not a single victim had recovered. Its incubation and development proceeded invariably from fever to death within two days of inception. By April 14th, it was estimated that the dead numbered upwards of 3,000,000 in Russia alone, with the number of cases anybody's guess at from one tenth to nine tenths of the total population. The staggering toll of the dead, unwatched and unburied, lying where they had fallen in streets, homes, buildings, cars, stores, and conveyances, gave off no longer the murmurous whisper but now the intolerable stench of decay. The only reason that diphtheria, typhus, tetanus, and other epidemic diseases did not rage unchecked was that The Whisperers left nothing but corpses in their wake.

Bulletins had stopped coming from Moscow or anywhere else in the U. S. S. R. by April 14th, but newspapers in other countries dismissed the lack simply by printing the fact that news had stopped coming from Russia.

By April 14th, the exodus from Paris had begun, the evacuation of Hankow and Shanghai and Tokyo had started, the desertion of every large capital and every spot where The Whisperers made their appearance. Humanity was attempting the impossible feat of running away from itself. The same scenes of flight, the same fierce scramble for exodus, the same terrible swiftness of contagion, the same pyramiding of cases in mathematically progressive leaps, the same increase of the abandoned dead in buildings and streets was occurring in so many places and countries now on so rapidly expanding a scale that the magnitude of the catastrophe dwarfed its localized appearance.

AS a result of geographic position, the two Americas and Australia had thus far reported no instance of the fever. Australian authorities were unaware that their bomb carriers and pursuit planes had not reached the lonely north coast until after several air transports of Japanese had flown across the wilderness and landed at various points. A majority of the fugitives were detected and killed, but the damage had been done.

The case for survival far outweighed the humanitarian appeal. The Americas declared an absolute blockade. No ships arrived after the middle of April, because crews and passengers died before they had half completed the voy

age. The derelicts drifted at the whim of wind and water in the middle of the Atlantic and Pacific oceans. But plane after plane was shot down, and for a while it was believed that the mobility, quality, and quantity of American defense armaments might enable the continents to escape; but the same speed of modern communication which had proved a curse to Europe and Asia brought The Whisperers to America by way of a stratoplane that eluded watchers and landed in New Jersey. The passengers deemed themselves to have escaped the whispering fever, but shortly after landing, several of them began to run temperatures, and in a matter of hours the fatal whispering, like the rustle of swarms of maggots, but without visible agency or known source, made itself heard.

While the whispering fever raged on through those hideous days of April, two tired, unshaved, and half-starved scientists worked incessantly, ate briefly, slept little, and kept on working in the laboratory of the O. I. S. Co. They lived there, worked there, slept there, and begrudged even their allotted four hours of sleep per day. The moment the gravity of the whispering fever became apparent, Chard had joined forces with Langley. Since it was easier to transport the tools and supplies of medicine than budge Langley's complex invention, most of the drugs and chemicals known to science now filled a large part of the laboratory. The goals of Langley and Chard had achieved world importance. They got what they wanted for the asking.

Langley made minute adjustments of his photo-micographic magnifying apparatus. He watched tensely as blurry, unrecognizable images swam across the photoscreen. He slumped in nervous fatigue. "Another failure," he muttered. "What's the latest news?"

Chard said, "I dropped down to the front office television set a few minutes ago. There's a report that a stratoplane got through the blockade and landed somewhere in Jersey."

Langley was already making minute new changes in his invention. "That gives us only two or three days more, if the report is true. How are you making out?"

"I won't know until your invention works. So far, no one has recovered from or proved immune to the whispering fever. It was sheer suicide on the part of physicians who tried to study it first-hand. All I can do is get everything ready in case the high magnification materializes. There won't be time to consider antitoxins. If a cure or check can't be found in drugs, history ends in about a week."

Langley focused an invisible beam on an invisible organism, whose existences were registered and controlled solely by micrometric precision instruments. "Who do you suppose ever started this infernal thing? Some crazy scientist? Or some nation that decided to wipe out its enemies?"

Chard shook his head. "Tommyrot. If any scientist created the whispering fever, he would have been dead before he knew what he had done. No nation would have used the plague unless it had an impregnable defense. The plague has struck everywhere. No one on earth had a part in launching it, except accidentally."

"Isn't that a rather extreme statement? I know that new diseases have appeared from time to time in the past, and that a theory was long ago advanced that bacteria may have survived interstellar cold and drifted to earth from other regions of space. I know it's been suggested that life may have originated in such a fashion. But the source of the plague was a projectile. Are you implying that inhabitants of another planet deliberately sent the projectile here with the notion of destroy-

ing human life before they took over the globe?"

"Hardly. It's a remote possibility but highly implausible."

Langley returned to his calculations. Where the projectile originated didn't matter. Time was precious, and the hours slipped by faster than he cared to think about. Only a matter of days remained, perhaps less time still if the plague had truly reached across the Atlantic.

Constantly he was on the verge of success, but it always eluded him. He had magnification, now, stupendous magnifications of 100,000,000 to 500,000,000 diameters, but the images were badly distorted and meaningless. He must find a way of correcting the image, of throwing it into clear focus. He went over and over the delicate parts of the mechanism, making microscopic adjustments, working against time and fatigue, seeking the one micromillimetric correction that would give clear definition to the image.

The afternoon passed, brought nothing but failure. Toward evening, Chard hurried out for a breath of fresh air and for sandwiches. He almost collided with a running stranger as he emerged from the building. "What's the hurry?" he demanded.

The stranger gasped, "The plague's here! A chap just broke out with it on Fourteenth Street! I heard the whisper!" The white-faced stranger raced on his way.

Chard felt depressed when he returned to the laboratory. Unless they succeeded soon, this was the end. By dawn, the exodus would be in full force. Mountain tops and mines, wilderness and desert, any spot offering apparent seclusion would in a day or two be black with refugees possessed of the same notion.

The physician did not tell Langley of his encounter. The physicist was already working at top speed. He paused long enough to wolf a sandwich and hot coffee, before resuming his calculations with worried eyes.

THE ROOM seemed warm, oppressively warm. Chard wiped his forehead. His burning face was sign enough that he needed sleep and rest. But there was no time for sleep and rest. He toiled for hours, as the evening waned, and gradually a vast uproar began to rise above the city, and Chard knew that the panic was on. Flushed and weary, he paid little attention to what went on outside, and sensed the noise as something far away and impersonal. Voices—the voice of the mob——

Chard suddenly tensed, every sense alert, listening with a dull feeling of futility to what he had feared he would hear.

There was a faint murmur in the room. The whisper came from his own body!

His memory flashed back to his encounter with the fleeing stranger. He recalled the sensation of heat and fever that had been growing on him ever since. The whispering plague dwelt in the laboratory.

Langley muttered, "If only I could define the image! I'm close to success, so close that I can't see what's wrong, something that would be obvious to any one else."

Chard left like blurting, "It doesn't matter now. The end is here. Let's go out and celebrate our last day of life." Instead, he looked at the photoscreen where the blurry objects swam and spoke tiredly:

"If you've got the magnification you want, and can't define the image, maybe the trouble isn't in the invention at all. Maybe it would work perfectly except for some outside influence. Could cosmic rays cause any interference?"

Langley shouted, "You utter idiot, why didn't you think of that before?

Come on, help me get a load of lead sheaths." He ran toward a storeroom, Chard at his heels.

As they set up the heavy plates around the mechanism, Langley talked excitedly. "That's the source of error. It's so obvious I couldn't see it. Cosmic rays are bombarding us all the time in great numbers, and while they're submicroscopic, they're large enough and strong enough to affect not only the micro-organisms you're after, but even the selenium cells and electrical equipment."

The Whispering grew louder. "What of it?" Langley exulted. "I must have caught it myself by now, but I'll be satisfied just to see and know what is happening. It's inevitably appropriate that we should make the discovery in a drop of your own blood. Get a slide ready and we'll shoot it under the beam."

Chard's mood had passed from despondency to eager excitement. In the moment of action he became the cool, skilled physician of old. He pricked his thumb, caught a pin point of blood on a slide, and passed it to Langley. The air was stifling, for they had left an opening only at the floor on one side of the hastily constructed lead chamber.

Langley slipped the slide under the focal beam while Chard kept his eyes glued to the photoscreen.

An image leaped into clear, true definition on the photoscreen, an image that changed and flowed only with the activity of life itself. He was looking at a world that no man had ever before seen, the world of infinitesimal micro-organisms and filterable viruses. Sick and appalled at what he saw, the blood pounding through his veins and head till he thought they would burst, stricken into momentary silence and paralysis, he stared at the screen. The mystery of The Whisperers had been solved.

They were living, breathing, organized, intelligent entities! On an inconceivably infinitesimal scale, in an evolutionary pattern alien to everything known to man, they had developed a strange, fantastic civilization. The whisper audible to human ears was the combined sound of trillions and trillions of micro-beings who talked and flourished and evolved through an existence that was time-extended to centuries and cycles for them, but which was time-foreshortened to moments and hours in the universe of man.

The screen was a blur of such frenzied activity that Chard could merely guess at much that happened. He caught glimpses of micro-beings of feathery outline. He had fleeting impressions of an incredible life urge. The incalculable hosts of The Whisperers lived, struggled, and died for the basic driving impulses of multiplication and colonization, and for ulterior purposes beyond comprehension. Hordes of them shot from the screen. Their vanishing offered to Chard a reason for the astonishing speed with which the plague had spread. They must have passed easily, with or without the aid of devices assembled of body materials, from the partially oxygenic medium of blood to the impurely oxygenic medium of air.

Langley stared in the fascination of horror at the screen of teeming, subhuman life that poured through the cycles of an extra-terrestrial evolution. He realized far less than Chard what was happening, but the little he understood made him ill. He experienced a crawling sensation as though every molecule became separately conscious of the parasitic legions that it nourished. The Whisperers—multiplying and swarming through his body in numbers that could be expressed in no less than astronomical units——

His scalp prickled. In almost inaudible tones, he mused, "Knowledge! Lord, I'd rather live in ignorance the rest of my days."

The sound of his voice broke Chard's

spell of inertia. Langley had done his work and succeeded brilliantly. Without it, Chard could have made no progress. Now, the physician thought in terms of the unpleasant realities that always accompany medical analysis. The facts were at hand. The facts must be interpreted. His mind worked with concentrated power to solve the problem. A pathologic condition existed. A great number of potential counteragents were known. Which of them would be most likely to neutralize the condition in the briefest time?

Chard looked as if about to speak, but ducked out of the lead chamber instead. He ran to the telephone and talked for several minutes. When he hurried back, he found Langley by the shelf of narcotics.

The physicist asked wearily, "Morphine or cocaine?"

Chard stated, "Neither. I just called the Television News Bureau and the Department of Public Health. The voice of The Whisperers will be silent within a week. You and I are going to get drunk!"

The physicist looked puzzled. "Have you lost your mind? In the first place, I don't drink, and——"

"Nevertheless, you are going to be saturated with alcohol by drinking, by intravenous injection, or by any other method you prefer! Narcotics would be as efficient, but the world supply isn't large enough and the cure would be as bad as the disease.

"Alcohol is rapidly absorbed through the lining of the stomach, enters the blood stream, and circulates to every part of the body. I'll give the world a headache and a hangover, but all except weaker constitutions will survive. The point is that temporary intoxication to man will be permanent oblivion to The Whisperers. Their existence and spread depend on rational processes. Paralyze their ability to think, eat, or act, and they are done for. A night of revelry for us will be a century of death for them!"

The truth and the fulfillment of Chard's prophecy are now familiar matters. It has been regretted that the remedy required extermination of The Whisperers before the secret of their enigmatic civilization was solved. It may never be known whence they came, or whether they themselves constructed the projectile that brought them. The later uses of Langley's invention, and the vast new worlds of knowledge that it enabled man to explore have a value that can not be estimated. The Whisperers are gone. Only a few slides exist upon which their dead, inert forms are preserved, but the sound of their voices is a memory that can never be forgotten.

N'Goc

by Raymond Z. Gallun

UL the Thinker, chieftain of a tribe of Shaggy Men, crouched high in a treetop and gazed westward with an intensity born of mingled dread and fascination. The expanse of the jungle roof extended before him, vague under the stars. The night noises of the primeval world went on as usual. Nor as yet was there anything very interesting to see. But Ul had an unholy tryst to keep; he had kept it after sundown on every clear day for more times than his simple memory could recall.

Heat lightning pulsed above the western horizon, making the crests of the taller trees stand out like puffs of black smoke. It irritated Ul but it did not deceive him. Presently his eyes nar-

rowed under beetling brows. There was a steady glow shining through the flares of static electricity, like a false dawn. It brightened as the seconds fled, until a little crescent shot above the low bank of clouds that rimmed the sky. The crescent cast a scintillant luminescence as it climbed zenithward with an easily visible motion. Eerie shadows began to creep and shift through the forest as if they sought to hide from the invader of their realm.

Ul the Thinker sucked breath between flabby lips in a way that was almost a gasp. From somewhere below, mingling with the sodden *drip, drip, drip* of the jungle, came the slithering scrape of a scaly body, where Iss the Serpent wormed its way through foliage. Far off, Uch the Saber-tooth grunted hoarsely. Yet Ul did not bother to listen.

"N'Goc!" he rumbled deep in his throat. His tone was a paradox. It resembled that of a curse; still there was in it an element of religious awe.

Ul's single word was the name of the shimmering crescent—N'Goc, spirit of pestilence, misfortune, and death. A terrible word to speak. The names of Zuul the Mad Mastodon and Urr, the Smoking Mountain were as nothing beside it.

Actually N'Goc was a tiny moon, less than a mile in diameter. A half million years gone by, during the age in which the Shaggy Men lived, it swept with vast speed around the Earth, completing its circuit several times daily. So rapidly did it pursue its path that it outstripped the rotation of its primary, and hence arose in the west and set in the east. Its orbit was just beyond the limits of the atmosphere. N'Goc possessed an ancient wisdom, the nature of which was beyond the reach of Ul and his fellows.

The minute satellite had appeared regularly in the heavens since before the first Protoroa had squirmed in terrestrial seas. Its presence was perfectly familiar to Ul, and he did not keep so conscientious a watch solely to look upon it. The truth was that of late N'Goc's small bulk was swelling ominously, as if it sought to alight upon the ground and bring evils to mankind.

It was this dread thought that had kept Ul at his vigil for so many evenings. There was within him a premonition that soon the mystery of N'Goc's behavior would be revealed.

He watched its crescent now with the keenness of a beast that seeks to estimate the least move of a deadly enemy. It seemed to hurtle toward him across the heavens, like an aircraft bent on some sinister mission. When it had climbed halfway to zenith, something happened that gave reason to his long watch. Between the horns of the crescent a tiny jet of red flame spurted momentarily and vanished. The phenomenon was not repeated.

Ul's muscles tautened, but he made no move. His people were asleep in the trees about him. His first impulse was to awaken them and try to tell them what he had beheld, as far as the rudimentary language of the Shaggy Men permitted. He did not do this, however.

Instead, he waited, hoping, fearing to see more, his apish figure huddled in the shadows. Such was the Thinker's way. He was different from the others of his kind. His forehead was higher, his eyes clearer, his face less bestial. His intellect was less fogged and dim. He could throw stones accurately to bring down small game.

There had been an occasion when he had even made friends with a fire for a short while, until the flaming demon had bitten his foot severely. Strange processes went on inside his skull, processes which, in his descendants of the remote future, would mean comfort and happiness and enlightenment to countless millions of people. He was trying to understand things which were

beyond his understanding. But as yet his efforts had produced little more than the first glimmerings of superstition.

The wait was rather long. N'Goc was near to setting in the east when Ul glimpsed something high up in the rays of the satellite of evil, that made his hide tighten unpleasantly. He could make out several glinting specks grouped together, trailing above them gray-white wisps that wavered through the air like ghost veils. The specks were dropping groundward rapidly—not as rapidly as a stone would fall, yet with respectable speed. A wisdom older than that of mankind had cast aside its aloofness. N'Goc was about to speak——

A LATTER-DAY scientist would have found the little moon an interesting subject for study. It was an odd mite of a planet. When it was made in some celestial furnace, hot vapor had been formed within it, creating great bubbles in the vitreous substance of its mass. Out in space N'Goc had cooled quickly. Some of the vapor in the bubble cavities had condensed into water; the rest remained gaseous, being mostly oxygen and nitrogen, the constituent elements of an atmosphere fitted to support life. Both the air and the water were effectively sealed up in the caverns of N'Goc, where they could not leak away into space, as they most certainly would have done had they been exposed outside its crust. The gravity of tiny N'Goc was too weak to retain vapors in the ordinary manner of worlds.

The ingenuity of nature is endless. Through the translucent, quartzlike shell of N'Goc, sunshine found its way into the labyrinth of caverns, supplying warmth and light. Environmental conditions were favorable to the development of living organisms. In due course they made their appearance, and started on their long evolutionary climb.

At length N'Goc gave birth to a race with the necessary attributes of intellect and initiative to set up a civilization. Blunderingly at first, climbing out of abysmal barbarism, then with increasing efficiency, they went to work to make the most of their opportunities. Their destiny seemed secure.

She who must be called the Philosopher, since she had no other name by which she might be known to humans, was ruler. A long line of the Philosopher's ancestors had held the position of power before her, guiding the subjects of the empire along channels of prosperity and peace. Grotesque though she was in form, her mind was comparable in many ways to that of man.

The Philosopher was the most enlightened individual that N'Goc had ever produced. In her brain was amassed all the knowledge that her kind had attained. Nor was she satisfied; she wanted to know more and more.

Through an air lock piercing the shell of N'Goc she ascended with her councilors to the barren surface, sealed in a hollow sphere of quartz. With instruments, crude but ingenious, they made astronomical observations and discussed them carefully.

It was thus that they discovered the handwriting on the wall.

LATER, all the wise ones of N'Goc assembled in a buried grotto to receive the Philosopher's message. Bluish light sifted down through the moisture-dewed roof above, and odd mechanisms and vegetation crowded about the floor. It was a bizarre assemblage of Lilliputian monsters. A ring of many-limbed forms crowded around the central throne on which the Philosopher squatted.

Like wands she waved her forelimbs in a rhythmic cadence. No sound was made, for the language of the small inhabitants of N'Goc was a language of gestures.

"The Great Mother World wants us for her own," the Philosopher explained.

"Our planet is slowing in its orbit; very soon the centrifugal force of its rotation will not be sufficient to prevent it from falling to destruction on the surface of the Great Mother. The terrific tidal drag which the Great Mother exerts upon us is responsible for the gradual stoppage of our world."

"What can we do to prevent the extinction of our kind?" the councilors demanded in unison, fear showing in their multiple eyes.

"Nothing is possible except to trust ourselves to the kindness of the Great Mother," the Philosopher replied calmly. "The time is very short, but we have the means to effect a migration of a small part of our people before our world is destroyed. We have the black powder that flashes into flame with a loud noise. We shall construct passenger cars which can be hurled across the emptiness to the surface of the Great Mother. Since the gravity of our planet is so slight it will require but little force to send them on their journey. Then, if the Great Mother is benign, and destiny favorable, our clan shall thrive in its new home. We shall proceed with our task immediately."

An ovation of waving limbs applauded the Philosopher's message. In action against adverse circumstance the plucky inhabitants of N'Goc were at their best. When order had been restored a wise one spoke up:

"All is clear except for one thing, Mighty Mistress," she said. "The Great Mother is very huge. We must make ready for the landing with utmost care, else the cars shall be scattered far and wide over her surface, some of them perhaps even falling into the oceans. All must descend in the same spot that the voyagers may learn together, and that they may cooperate in reconstructing our culture. Else there is grave possibility that our kind shall revert to savagery, perhaps for all time."

"It is true," the Philosopher responded. "I have already considered it. I assure you that all caution shall be exercised. Now go forth, all of you except Four and Nine, and inform the populace. Four, Nine, and I shall remain here to perfect the plan."

Amid a flurry of N'Gocian cheering the council was dismissed.

During succeeding days the minute moon was transformed into a work shop, seething with feverish activity. The grottoes reeked with the smoke of the furnaces as iron was mined and smelted and wrought into shape. At a carefully predetermined place on the glassy outer crust of the satellite, a dome of gelatinous substance was erected, and air was admitted to its interior from below. Here, safe from the cold vacuum of space, the N'Gocians excavated eight circular pits, arranged close together in a cluster. Cores were shaped, and molten iron poured into the pits to form the cannons that would fire the eight projectiles being built in the labyrinths.

The metal was allowed to cool, the cores were removed from the guns, and the black explosive mixture of saltpeter, sulphur, and charcoal, was dumped into the muzzles, preparatory to receiving the shells.

The Philosopher, ever present under the dome, watched the operations with tense interest. She would lead the exodus, not because she feared to remain behind and perish in the destruction of N'Goc, but because, of all her people, she was best suited to command. The culture of her kind, its learning, its sciences, and its arts, were safest in her care.

The time came when all was in readiness for the venture. The necessary things for recreating the civilization of N'Goc were loaded aboard the projectiles, which had been lowered into the cannons. Domestic animals were included in the list of necessities.

The passengers, representing highest-type individuals from each of the various

races of N'Goc, waited tensely in the silken cradles that would protect them from the shock of starting. The dome, that had covered the scene of operations, had been torn down.

In a cavern near the bases of the guns, a water chronometer shed drops steadily, counting off the moments. A small, brown, hairy N'Gocian watched the process with intent gaze, waiting for the proper instant in which to act. Presently a clawed limb moved forward, kicking a glowing ember into a receptacle filled with powder. There was a red flash, a hiss, a roar, followed by a thunderous concussion such as ancient N'Goc had never previously experienced. The eight guns had spoken in unison. The shells and their occupants were on their way to their new home, leaving behind them their native world, still populous, but doomed.

UL the Thinker, perched in his tree-top, felt his flesh twitch with excitement. He arose upon the branch which supported him and bellowed a throaty warning into the night.

His tribesmen were aroused. Their movements made rustling sounds in the foliage, and their questioning cries echoed through the forest.

Ul gestured toward the falling objects, above which long streamers of floss extended, checking their velocity a little. "Daea!" he shouted. "Daea!" The things seemed likely to land in the treeless plain several hundred yards eastward, between him and the ramparts of Urr the Smoking Mountain.

For a moment Ul was undecided. Part of him was urging his limbs to hasten away in flight; another part of him was demanding that he investigate at once the nature of this weird visitation. And it is to his credit that curiosity won in the end. By this time the projectiles had vanished behind the trees.

As quickly as he could, Ul plummeted from his perch to the jungle aisles, calling his tribe after him. Though they slept above ground for safety's sake, the Shaggy Men were not truly arboreal.

Thick noises gurgled in Ul's throat commandingly. "Those who are not cowards follow me!" he ordered.

Apish eyes blinked in the light of N'Goc that dappled through the leaves, but no one essayed to obey. The knotted, muscular forms of the males remained stolidly still. Even huge Tuj, Ul's friend, did not offer to accept his leadership now.

Had it not been for the twinges of terror in his own soul, Ul would have been glad to conduct his researches alone. But since those twinges were present, he desired moral support. And so, exercising almost unconsciously a talent for persuasion which had done much to make him chieftain of the tribe, he flung scathing accusations right and left.

"Cowards!" he screamed. "Tuj, Maz, Gee, Lor, Alla, Zir! All of you are cowards!"

Living as they did in a savage world, courage was the greatest virtue in the eyes of the Shaggy Men, and lack of it the darkest shame.

The males bristled under Ul's cutting words. Their long arms flexed, their lips curled away from yellow teeth, their massive chests heaved with indignation.

"I am not a coward!" mighty Tuj bellowed, and the others echoed his words.

"Then follow me!" Ul challenged. Turning, he bounded off through the undergrowth toward the plain, heedless of the possibility that dangerous beasts might be lurking near. The six other males of the tribe were at his heels. He had won them over.

Ul experienced no difficulty in locating the N'Gocian projectiles. They had all landed within a radius of two hundred yards, near the center of the plain. N'Goc had set, but the brilliant stars and the red glow from the Smoking Moun-

tain, augmented by an occasional lightning flash, provided sufficient light. The silken strands of floss which had helped to check the fall of the shells still streamed in the air above them, showing white, like threads of vapor.

With utmost caution, prepared to retreat at a moment's notice, Ul approached the nearest of the shells, his fellows making a huddled advance behind him. The Thinker's heart was a lump of protesting motion inside his breast. He was afraid, but he managed to control himself, for out of his fear an idea was growing.

The object lay at his feet now, half hidden in the thick grass. It was a cylinder with a pointed end, two paces in length and one pace in diameter. The dull silvery sheen of it was new to him. Only water shone like that, and this was certainly not water. The wavy streamers of the floss parachute were very light and fine.

Slowly Ul stretched forth a calloused paw, his body taut. He shuddered with a revulsion similar to that which the effort of touching the scales of Iss the Serpent might have aroused in him. His fingers came momentarily into contact with the cylinder; then darted back. Encouraged a bit, they made a more successful attempt to feel the substance of the thing. It was cold like the flesh of Iss, and hard as stone, and smoother than any surface that he could remember. Ul the Thinker's awe increased.

MERE curiosity alone could not have made this pre-Stone-Age man so bold. Terror, or at least an instinctive something closely allied to terror, was his guiding force. This object, and the other objects scattered around it in the grass of the plain, were associated with N'Goc, the satellite of evil; that much he was certain of since he had seen the flash of red fire on the tiny moon. Why were they here? That their purpose was sinister he could not doubt. It was this realization that provoked in Ul a dim though mighty desire to put them where they would never be able to inflict harm upon him or his people. In part the urge was pure instinct, like that of a dog when it pounces upon a live coal that has fallen on a rug.

All at once the thoughts in Ul's primitive brain bridged a gap, and reached a clear, if naive, conclusion. He turned to his companions who stood still huddled together, behind him.

Rumbling noises issued from his throat, and his hands moved in clumsy gestures. With only a few words available, explaining an idea that was less simple than an everyday matter was always an effort.

"These shining things are the eggs of N'Goc, the wicked spirit," was the substance of what he managed to say. "They will hatch, bringing forth many demons to torment us. We must destroy them while there is yet time. I will take this one. The rest of you collect the others; then come with me."

Once evolved in his simple brain, the idea became fact as far as Ul was concerned. Fighting his quaking muscles he picked up the cylinder. In comparison to its size its weight was small.

It required many taunts of cowardice, and promises of dire consequences if the deed was neglected, to induce his companions to follow him, but in the end the Thinker accomplished it. The Shaggy Men gathered the shells, each carrying one, with the exception of huge Tuj, who handled two with ease.

With Ul in the lead they started east toward the place where the sleepy lava pit of Urr the Volcano, dyed the sky in umberous hue. Ul's plan was drawn up.

It was a long jaunt. Damp with sweat, they were climbing Urr's slope when faint scratching sounds inside their burdens almost caused them to abandon their task and race like maniacs away from these dread arrivals from N'Goc.

The party neared the lip of Urr's

crater. Within and below the crusting lava glowed sleepily. It heaved and buckled with slow deliberation, as if some fire colossus of the inner Earth wallowed beneath its surface, and was turning lazily over in its slumbers.

Zir had found a better footing than his fellows, and was thus able to attain the brink of the pit a few seconds before them. He raised his burden above his head to cast it into Urr. N'Goc, its vitreous crust gleaming as gorgeously as a vast baneful jewel, leaped above the horizon.

Meanwhile, out of sight yet very near, another bit of drama was being enacted. The Philosopher, in command of the refugees from her doomed planet, had been stunned by the shock of being shot into space, in common with those under her guidance. Now, however, consciousness had returned to her.

The projectile boasted no windows, yet a dim light emanated from a phosphorescent fungus which had been shipped for that purpose. Since they did not possess the stamina which had been bred into her, none of her kind had regained their senses as yet. The slave creatures and other domestic animals were more fortunate. Wiry, tough, a number of them seemed capable of almost normal activity.

The Philosopher detected a regular swaying motion in the vehicle in which she was sealed. It was a movement which her quick, unterrestrial faculties could not interpret; in consequence she arrived at the conclusion that it meant trouble—serious trouble.

In her ancestry was savage cunning and blood lust, even cannibalism; ages of civilization had submerged and sublimated her darker nature. Now it came to the fore, however, furnishing a stimulus for defensive action. The Philosopher had the fate of a culture and a race to protect. She went about it in a businesslike manner.

She climbed from her silken cradle, and on daintily vibrating limbs hastened toward the nose of the shell. Attached to her bulbous body was a tiny metal tube. Quickly she disengaged it, and with a daub of gelatinous exudation, fastened it in a certain manner to the joints of her forelegs. The Philosopher was not unarmed, and besides, she had the weapons which nature had given her.

Giving orders with swift movements of her limbs she marshaled forward the slave creatures and domestic animals that were conscious. Though their intelligence was small they still possessed an instinctive and robotlike capacity for fulfilling complicated commands, bred into them by ages of careful selection. And they could fight effectively enough.

ZIR, the shaggy henchman of Ul, completed his act, hurling the first of the cylinders into the crater with a surge of powerful muscles. N'Goc, hurtling erratically low now, made his black shadow sprawl like a twisted monster of the fourth dimension against the jumbled rocks. Turning and twisting, the shell tumbled downward. Its parachute of floss, discharged originally in space from an automatically operated pack, had become too tangled now after the climb, to retard the fall to destruction. The shell imbedded itself in the hot lava. A few moments later there was a plopping sound and a puff of acrid smoke, as the expansion of the heated air inside caused it to explode.

Other projectiles were following the first like a gust of rain. With emotions of relief the Shaggy Men were ridding themselves of their burdens. Crazy N'Goc looked on without concern. Urr the Volcano yawned its sulphurous yawn, as usual. Nature was unruffled, even though a culture and a people were going to their ends. Ul and his fellows, far inferior in mentality to the children of the doomed satellite, did not even know, truly, what they were doing.

However, neither the civilization nor the race of N'Goc had perished yet. Fury, hope, and valor still burned high. The Philosopher loved the ancient traditions of her kind.

Ul the Thinker had not yet cast away the shell he bore. His fellows were puzzled at the delay, since he had led them. They looked toward him. He stood rigidly still, a yard or two from the crater's brink. His face was a frozen mask of terror.

A circular door had opened in the nose of Ul's projectile. He had felt tickling sensations on his body, as if little devils were scrambling over him. There was one of them now, on his hand—something black and hairy, about the breadth of a large leaf. It resembled certain small, repulsive creatures of the forest. A savage pain flashed through Ul's nerves as the thing bit him. The other devils were biting him, too. He screamed and dropped the shell. With a clang it struck the rocks and bounded back against his shins.

Enraged, he would have kicked it into the maw of the volcano then; but there was a flash of light and a sharp though small explosion from the vicinity of the demon on his hand. A daring numbness began to spread from his shoulder, for a minute dart had brushed his skin there. For a moment of destiny his kick had been delayed. Now he finished it, sending the cylindrical shell wabbling into the prodigious yawn of Urr. With a swift jerk of his wrist he sent the Philosopher after it. Then, the spark of his mind fading, he crumpled to the ground.

Ul the Thinker did not see the grotesque monsters that scuttled away into the shadows. Domestic creatures of N'Goc, they were, instinctively clever in certain respects, as an intricate machine might be, yet not possessing much true intelligence. Their forms were somewhat like that of the Philosopher's. In them her native world was leaving its legacy.

Fear-stricken, Ul's henchmen had fled—all but huge, loyal Tuj. Tuj bore him back to the forest. The Thinker did not die then, for the dart had only grazed his skin. Yet its potent poison kept him in a stupor for many hours.

Afterward he must have realized in his dim way that a battle had been lost and won; but he could not have grasped its true magnitude. He could not have guessed that but for his deeds, the dominant species of Earth might not have been man.

Within a fortnight a period of incredible tidal waves, storms, and earthquakes, began. N'Goc, the evil moon, had fallen into the ocean, somewhere on the other side of the planet.

THE YEAR was 1935 A. D. An entomologist and his young wife watched with mingled awe and amusement, a large spider imprisoned in a wire cage. It was pulling a vertical strand out laterally by means of a second strand attached at right angles to the first, and thus was hoisting a live frog, much larger than itself, from the floor of the cage.

"The old engineer's pretty good, isn't she, George?" the girl chuckled.

The entomologist nodded. "Almost humanly ingenious," he responded. "You know, Mae, I've often wondered if there isn't something in the ancestry of spiders—a wise shadow from Heaven knows where, that came in a past not too remote to have lost its influence on its descendants."

Continued—

I'm sort of picking up the thread where lack of space stopped me last month. I had to put the Harry Bates' story over to the June issue because of starting the John Taine serial. Still it leaves us with seven complete stories and two serials in this issue.

You know, I get so eager to crowd in just one more story that I forget type isn't rubber. And then I'm jerked up short by the fact that I can't put 192 pages of type into 160 pages of space and still have room for Brass Tacks! So I go to work like a Scotchman in a gold mine—trying to leave out as little as possible and avoid chipping the schedule, too!

Here's some good news. Jack Williamson, who has had a year-long siege of serious illness, is improving. I have two of his new stories to read in the next few days. Here's hoping, for he seems to be a universal favorite.

Don't overlook the fact that we're taking a big step forward this month in bringing John Taine back to science-fiction. I'm not sleeping at the switch, ever.

And if some of the writers you've asked for haven't appeared, it is either because their stories have fallen short, or because they are not available. It isn't because I haven't tried.

Astounding is leading the field by a wide margin in its number of readers. That would be a great satisfaction to me except for one thing. I KNOW that we aren't reaching more than half of our potential audience. And in order to drive ahead toward 1935 I need your coöperation in reaching that audience.

We have progressed slowly, steadily, month after eager month since October, 1933. I appreciate your coöperation and have tried to prove my appreciation by reaching out for an ever-widening circle of capable authors. That is my best means of showing my appreciation. Taine, Daniels, Coblentz, Fearn, Binder, Stuart, Wandrei, and Gallun in one issue of one magazine! Two years ago we wouldn't have believed it possible. Now we take it as a matter of course. Yet it has meant hard, driving work, and continued effort on my part. I feel that it gives me the right to ask your cooperation in introducing our magazine to new readers.

We know some people lack the imagination to enjoy this type of fiction; but we also know there are many who would be delighted with it if they found it. You helped me to gain 35% in our circulation in 1934. I want you to coöperate once more and help me to drive through to a 50% increase during 1935. We need it to expand in the final manner I have in mind. It will be a mutual benefit because it will give me the power to carry our program forward in ways I dare not even suggest as yet.

I believe we are giving you the best science-fiction magazine by a real margin in quality, quantity and price. And yet I know we are only scratching the surface of a field where the horizon is limitless.

Let's carry on. Our reading circle is expanding. Let's help it along.

——The Editor.

With Mr. Kaletsky's Compliments.

Dear Editor:

Mr. Karl van Kampen's reply to my criticisms constitutes an excellent example of the pot calling the kettle black. After accusing me of failing to make any reasoned, logical argument, he proceeds to develop an argument in his own behalf which would not do credit even to a high school student.

Returning to the exact *locus* of this debate, we find in the fifth paragraph of the second column on page 49 of the December, 1934, issue, the statement that the Earth has an enormous magnetic field. In my letter, I pointed out that Earth's magnetic field, even at the surface, is not large. Mr. van Kampen saw fit to ignore this correction, a sign of consciousness of weakness on his part. At the surface of the Earth, the mean magnetic field strength is one-half gauss, which is the "enormous" force of one-half dyne per unit magnetic pole. Or, translating to more comprehensible terms, the Earth's magnetic field exerts a force of 1/2000 gram per unit pole, which is the same as one sixteenth of a pound per unit pole, approximately. Out beyond the Earth's atmosphere, the field would be even weaker. Let me point out to Mr. van Kampen that ordinary electric generators utilize magnetic fields of 6,000 to 12,000 gausses, slightly different from the Earth's magnetic field of one half gauss. The electric current generated by the *Invincible*, the space ships proposed by the author, would produce just enough current to light a few flashlight lamps, perhaps not that much either.

The objection Mr. van Kampen raises to my discussion of the falling off of gravitational and magnetic fields with increasing distance from Earth's surface, is as fine a bit of quibbling as I've seen in a long time. Note that he spends a dozen or more lines pointing out that my arithmetic is somewhat incorrect, and then dismisses the point I made concerning the necessary diminution of obtainable electric power because of the diminution of the other factors with the airy designation, "unimportant." Excellent bearing about the bush, but the point is important, for all you say.

To get to the main topic under debate, Mr. van Kampen based his thesis in *The Invincible* on the fact that the distant nebulæ are receding from the Earth at speeds of about 13,000 miles per second. In his letter, he asks me not to take that very point too seriously as it was intended merely as an illustration. When you've made up your mind, friend Van Kampen, we may be able to proceed to a definite conclusion.

In his letter it appears that he has belatedly gotten around to clarifying his thesis by stating that the work the space ship's fuel did consists of the difference between the ship's initial kinetic energy and its final kinetic energy. So much is obvious to any one. But he failed to state this in the story. In *The Invincible* he led us to believe that the work done by the fuel consisted of the ship's kinetic energy with respect to the nebulæ, instead of the change in the ship's kinetic energy with respect to the nebulæ. That was the implication of his argument.

I wish to reiterate that if the same amounts of energy spoken of in the story actually existed because the ship was traveling at such a high velocity with respect to the nebulæ, that energy could be utilized only in the space-ship-nebulæ system, and not in the space-ship-Earth system for the simple reason that the energy did not exist in the space-ship-Earth system because the ship was not traveling 13,000 miles per second with respect to Earth. If Mr. van Kampen insists upon this point he is immediately guilty of self-contradiction in that he will be arguing that so much energy exists by virtue of the ship's high velocity and that it also exists despite the ship's low velocity—with respect to Earth. Then he will attempt to mollify by calling upon the doctrine of relativity. But remember, Mr. van Kampen, that the work the ship's fuel does per second, in your own words, depends upon the ship's velocity, for a given force. And if the velocity is small, as it is with respect to Earth, the space ship's fuel is doing only a small amount of work each second, with respect to Earth.

If you still will not see the light, Mr. van Kampen, you are either ignorant, which I do not believe, or else you are shutting your eyes and quibbling for the sake of quibbling, in which case you are intellectually dishonest.

In the last analysis, since all bodies on Earth are traveling 13,000 miles per second with respect to the distant nebulæ, a toy rocket, start-

ing a force of only five or six pounds, must be doing vast amounts of work—(5x13000x3200 ft. lbs.)—each second. Where is this work? Certainly not here on Earth. If that energy exists at all it must be in the rocket-orbicle system. If the rocket pushes with a force of 6 pounds and travels about 100 feet per second with respect to Earth, it is doing only 2400 ft. lbs. of work per second, with respect to Earth.

I trust the great pains I have taken to make things clear will not prove futile. I must take exception to Mr. van Kampen's statement that his argument will be more clear to me as I continue with my studies of physics. It would be more correct to say that his argument would be more clear to him if he were to take his physics courses over more. It is quite apparent he has forgotten much of what he once knew, assuming, of course, that he is entirely serious in his statements. If he is not, there is nothing further to say, and all that has been said was a waste of time, energy, and paper.

I suggest that *The Irreverent*, my letters and Mr. van Kampen's letters be submitted to some disinterested third party, qualified to judge, who will read all the material and decide which of us is correct.—Milton Kaletsky, 1221 University Ave., New York, N. Y.

Mr. van Kampen Says:

Dear Editor:

Mr. Kaletsky is with me again, reminiscent this time of a jungle of childhood days having to do with sticks and stones. This letter is to be divided into two sections. Section One will be devoted to answering the innumerable objections Mr. Kaletsky raises to the items which might frankly be called "padding."

The story originally was little more than one page in length, purely an article. At the suggestion of the editors, it was rewritten as a story, and appeared in that form under the title *The Irreverent*. Now, so far, Mr. Kaletsky has attacked solely the items added as "padding," and has left the main point, the kernel of the story, entirely and severely alone. The question raised was: Is it possible to violate the law of conservation of energy? That particular point has not been touched by Mr. Kaletsky. Section Two will deal with that point, to show what this argument is supposed to be about.

PART ONE

(A) The Earth's magnetic field

I don't know what Mr. Kaletsky would call an enormous magnetic field, but I would say that a magnetic field that is appreciable, and measurable through a volume of some 3,140,000,000,000 cubic miles is enormous. What is a tremendous mass? I should say that a mass of a mere 2,000,000,000,000,000,000,000 tons was considerable, myself. Yet that is the mass of the Sun, and Betelgeuse is surely more massive—and present indications are that that star has a density slightly greater than that of what we ordinarily call a "good vacuum." So—but even platinum has a density perhaps a million times greater the mass of platinum in a ring is "tremendous" but that of Betelgeuse isn't, according to your remark concerning the low intensity of Earth's field. The intensity is beside the point and out of order, in so far as it contradicted my statement that it was enormous.

Furthermore the intensity of a field has very little relation to the magnitude of the current that can be generated. The voltage generated when a conductor cuts a magnetic line of force is fixed—but the formula says nothing about the current. With a low resistance conductor, the current could be very great, although admittedly not infinite.

(B) On Quibbling

When it comes to quibbling and "airy denigrations" I wish to point out that Mr. Kaletsky's denigration of the remarks concerning the falling of orbital velocity as "our arithmetic is somewhat incorrect" is an extremely delicate way of referring to it. According to him, the formula for orbital velocity would be something like $V = k/r^2$ while in fact the formula reads more like $V = k/m, r$. That is not a difference in arithmetic, it's a difference in fundamental fact. Had Newton made a similar bit of "arithmetic somewhat incorrect" on the law of gravity, he would not have been called the discoverer of the law. It's not bad arithmetic; it's rotten physics.

(C) Disturbance factors

They exist. But in the first place, the magnetic force does not by any means even approximate the inverse square law, as Kaletsky states. It does—around a free unit pole. Somewhere else and free of a south pole. It doesn't around a bar magnet—try it some time.

The Earth acts something like a bar magnet some eight thousand miles long, by no means diametrical, but by no means a free pole. North as does other ran, physically, be overcome by larger coils. I don't claim it's a practical way of generating power; as I have several times attempted to make clear, it was color, so important to the main story, physically possible, economically unsound.

SECTION TWO

I hate to disillusion Mr. Kaletsky, but the main basis of the story was not the high velocity orbicle. It had to do only with the Earth and the rocket. The entire story is based on the statements made—if you want page and line—the paragraph at the right-hand top corner of page 49 of the December, 1934 issue. It reads: "Now, since the ship is traveling ten feet a second, relative to Earth, and the push is one thousand pounds, then those ten pounds of fuel did ten thousand feet pounds of work. But if the ship just happened to be traveling at the rate of ten miles a second, then those same grams, burning at the same rate, in the same way, did 5,280,000 feet pounds of work." That is the problem supposedly under discussion. Shall we confine our discussion to that problem for a change, the real problem raised by the story?

Further, either Mr. Kaletsky is incapable of reading correctly, or does not wish to state correctly what he read. I refer to the high velocity orbicle only once, saying: "Well, the ship was traveling fifteen thousand miles a second relative to the more distant orbicle, and so at the same time those same measures of gas were doing work at the rate of—let's see—13,000 times 5,280 times 1000—that's seventy-nine billion two hundred million foot pounds of work from ten pounds of hydrocarbon gas. am I right?"

From this, Mr. Kaletsky says: "In *The Irreverent* he led us to believe that the work done by the fuel consisted of the ship's kinetic energy with respect to the orbicle, instead of the change in the ship's kinetic energy with respect to the orbicle. That was the implication of his argument." Mr. Kaletsky, sadly, it was not, by any stretch of the imagination, the implication of the argument.

In my own words, the work done by the fuel is dependent on the velocity. But the whole backbone of the argument is that it varies with the velocity, while there is no conceivable reason why the fuel consumption should vary in the least. That the variation is smaller I know, the point is, the work done per pound of fuel varies, with no evident limit either up or down. When the ship stands still, the rocket does no work, the top speed means a tremendous amount of work, limited only by the 186,000 m.p.s. law. Now, Mr. Kaletsky, please don't object that a hydrocarbon rocket can't attain that velocity. Believe it or not, that really isn't important.

I'd like to set another little problem suggested by a friend along the same line. An automobile is going fifty miles an hour. By catapult, a spring hurls a metal ball into it as it passes. It is caught by a second catapult, mounted in the car. This catches it and hurls it ahead with equal force, so that it leaves the car at an additional 50 m.p.h. Total velocity, 100 m.p.h.

This was done in two steps, by two springs of equal strength. In the second step, the speed was doubled, and the energy quadrupled. How come?

Finally, to Mr. "Ima Kranist." Your letter is interesting, but unfair to me and to the men who have worked on this problem with me. It is not so simple as to be easily dismissed. You readily derive the K.E. formulas, of course, but you are unjust to me, and to those others, in not believing we worked on that problem. You have not solved it. The work is relative to the source from which the K.E. is measured, whether you measure the work by the K.E., known to be relative because of the relativity of the velocity involved, or by the W = F·S formula, since S is calculated, actually, as a velocity. The work done is relative to the source, it varies with the velocity, which is relative. But the amount of fuel is absolute.

The only explanation I have received which answers, though does not wholly satisfy me, is that energy is conservative without being absolute. Just how that works out, I can't myself follow, but the man who suggested that solution seemed convinced. But I can, with absolute confidence, say that this is not a simple, two-minute solution problem.—Karl van Kampen.

Another for Mr. van Kampen

Dear Editor:

I have read the arguments for and against *The Irrelevant* in the February issue and I agree with Mr. van Kampen in his discussion of the other readers' letters. However, I would like to know how he gets around this.

He stated that an automobile does not exert as much pressure on the earth when traveling 100 feet per second as it does when traveling 10 feet per second, because it is pressing against something which is rapidly retreating beneath it. Suppose a rocket ship to be traveling 10 feet per second and a rocket is fired, the rocket will exert a definite pressure on the ship. Now, a rocket fired when the ship is traveling 100 feet per second cannot exert as much pressure as the first because the ship and rocket gases are more rapidly receding from each other. This seems to me to enforce the law of conservation of energy and also suggests that a constantly accelerating rocket ship approaches a limiting velocity which is proportional to the number of rockets it can and does fire at one time.

I think Brass Tacks is a place for what the reader thinks whether it applies to the magazine or theory and I would like to see more of the latter.

I have liked some of the stories tremendously and the others very well. The following stories, I think, have been the best: *Rebirth*, *He from Procyon* and perhaps *Colossus*.—Dale Carr, [illegible] Norwood Avenue, Norwood, Ohio.

Paging Dr. Smith

Dear Editor:

As you perhaps know, we science-fiction fans have been told by no less a personage than Dr. Edward Elmer Smith himself, that he is always ready for battle with "sprightly and courteous gentlemen," who would like to splinter a "lance or two" with him. Having neatly unhorsed his opponents thus far, he has yet to learn the meaning of defeat, of which subject he is to be an apt pupil, as I shall soon demonstrate! Although he is my favorite author, approached only by John W. Campbell, Jr., he, like all others, has made mistakes. I'm afraid it is my painful duty to point them out.

The trumpets blow, proclaiming the most spectacular battle in the history of science-fiction! As kings and queens assemble to watch the ensuing combat, my faithful squire hands me my pen, and—I'm off! "Defend thyself, Sir Knight!"

First of all, Dr. Smith, did you not completely ignore the Doppler effect in your stories? If an interstellar vessel traveled at speeds as far above that of light as the *Skylarks* did, the occupants could see nothing. Everything would appear black to them. For the suns and electric-light bulbs do not generate frequencies low enough to be brought into the field of vision.

Also—would not the frequencies emitted by the electric lights rise through all the dangerous frequencies of ultraviolet rays, x rays, gamma rays, cosmic rays and the dangerous frequencies of the fourth order mentioned in *Skylark Three*? Thus it seems that the careers of DuQuesne and Seaton would have been very short. Very short, indeed!

And I ask you, dear readers, did not Dr. Smith state in *Skylark Three*, that the neutronium used as a lens for rays of the fifth order had a temperature of 40,000,000 degrees centigrade? Of course, the neutronium, having no molecules, and not being in a position to radiate heat energy, would have a temperature of absolute zero! It would contain the heat energy of 40,000,000° c., but would, paradoxically, contain no heat. Incidentally, these same mistakes were repeated in *The Skylark of Valeron* (pages 132, 134, 137, Nov., 1934, Astounding). There are numerous other impossibilities in the *Skylark* stories, but, as I am confined to mathematically proved impossibilities, must leave them out.

And now, Dr. Smith, since you have had enough(?), I turn to my second and equally worthy adversary, John W. Campbell, Jr.!

But he stands there grinning smugly, not even deigning to meet me with his armor on. For, well he knows that his latest story, *The Mightiest Machine*, has nothing much the matter with it.

However, the variable star, Aarn, mentioned, was not a Cepheid. There are Cepheid variables and there are Cluster variables. The latter occurring in clusters, and the former as a solitary star. Aarn's "Cepheid," was a Cluster variable.

But it is a small victory, and I must depend on later chapters of *The Mightiest Machine* for something better. Beware, Sir Campbell, you may come off your high horse at the next jousting!

And now, having triumphantly ousted from their saddles my ambitious adversaries—with the possible exception of Campbell—I must retire into obscurity—and boredom, but the next time your authors prod and pull me into writing you again, you won't get off so easily!

And, please, Mr. Editor, don't go twice a month. No magazine can possibly keep up a high standard at that rate! And don't forget to keep the weird element out of Astounding Stories. There are magazines for such junk and Astounding is not one of them!

Incidentally, I am able and willing to contest any statement made in this letter with any readers who wish. Having watched his battles thus far, I more or less expect a comeback from Dr. Smith, but hunt as I will I can find no loophole in this letter for it.

When the lure of battle again draws me into violent scientific controversy, I must remember to make my letter shorter. What?—Philip Wallston, [illegible] Avenue South, Seattle, Washington.

Real Characters

Dear Editor:

I've decided that it's my duty, not only to get new readers for Astounding, but also to write in regularly in the hope of helping you a little to "lay a pattern for the future."

Aside from the handsome cover, and the co-operation—as welcome as rare, between Brown and Dold as to the characters in it, the figure of Alstair in *Proxima Centauri* ought to be an answer to those who claim there are no real, living characters in the stories.

And *Old Faithful*, though not a human, was, nevertheless, one of the finest characters in fiction—which brings me around to Gallun. His *Telepathic Piracy* showed the fine sympathy and breadth in characterization of his other stories.

and so one can question the excellence of his style. Unless you make him stop writing such stories, I shall have to build another throne alongside those of Campbell, Merritt, Leinster, Smith and Schachner. He never relies a story either by an incomplete or a conventional "happy" ending, but has always a satisfactorily perfect conclusion. Contenders to thrones are Williamson, for his splendid atmosphere in *Parasite Planet*, and Don Stuart for *Twilight*. I demand a real sequel to that! *The Machine* was good, but off the track. Sequelly speaking, if you can't get a truly worthy one to *Old Faithful*, don't print any. That story needs a sequel, but only one equal to the original.

Mr. Carr's *Gardners Five* was made excellent by the author's familiarity with his subject. Actually, in the South between 1929 and 1933, a Negro was shot in the heart, though not so as to cause immediate death. He was rushed to a hospital, and the wound heart from a newly dead body was substituted for the injured one. The operation was successful! For quick thinking, see the science section of the *Pathfinder*, 1929-1931.

Finally, *Mind of the World* and *Blindness* were both good, but the authors have done better, and will again, I hope. The issue of March, as a whole, was excellent and well-balanced. I trust that the April issue will contain a bi-monthly announcement as well as new authors.—Ramon F. Alvarez, Del Rey, 1016 Massachusetts Avenue N. W., Washington, D. C.

It's The Top

Dear Editor:

I'm sorry it wasn't A. Merritt, but, if it couldn't be he, I believe I'd rather it be John Taine than any other I can think of right now. I like him a lot, too, and am glad you could get something from him. But you won't give up trying for Merritt, will you? Don't stop till you do get him. I know you will, sooner or later. Astounding is the top after all, even without him, but with him——

Thanks lots for your personal answer to my little card. It shows how much our editor is interested in us readers, and in what we want and think. Good luck!—Harry Harvey, 109 East Rosemary Lane, Chapel Hill, North Carolina.

More About "Lot"

Dear Editor:

I read my first Astounding Stories last October. It proved such interesting reading that I could scarcely restrain myself waiting for the next and then each succeeding issue to come out.

Permit me to make a slightly belated criticism of *Lot*. In my estimation the author of that confused and slightly mysterious series should be definitely classed as species Crackpot. In one issue he insists the stars are not nearly so far away as is commonly supposed and that earthbodies would soon be falling rocket ships to them. In the everlasting installment Mr. Fort is equally certain that those heavenly points of light are nothing more than ramp fires kindled by some kind of cosmic boy scouts on the inner side of that shell which is supposed to surround the earth. How do those upper populations of the inner shell keep their footing anyway, or does the law of gravitation reverse itself up there?

Nevertheless, despite the pseudoscience, Fort's style, I think, has literary merit. Its queerness is positively fascinating. Please try to run a similar series, but one in which one doesn't have to take quite as much salt with it to make it palatable.

In conclusion let me say that the super-achievements of the Skylark of Valeron's heroes left me reeling and by all means let's have Astounding Stories twice a month—that'll give it wider scope and more authors will eat regularly.—J. Norman, Jr., Glen Head, New York.

A Call for Interplanetary Stories

Dear Editor:

Congratulations on your March issue; it's a hip. All the stories were good, but *Frontier Creature* beats them all. A sequel to this story is in order. A good second was part four of *The Mightiest Machine*. One author, Don Stuart, is improving with every issue. Brown, your cover artist, is great. Hang on to him.

Now as to those people who are always kicking about the rough edges, bah on them! They have scissors at home; let them use them. Next they will be wanting Astounding Stories leather-bound and printed on glossy paper. What does it matter if the covers are bad? Or the edges rough, just as long as the stories are good? That is what they buy the magazine for, not for covers or edges.

Now for a knock. You are not having enough interplanetary tales and are having entirely too many doctors' confessions and scientists' diaries. Have more interplanetary stories, or if you prefer your present policy, publish a quarterly containing only interplanetary stories upon which we old timers were brought up—15 years old.

I re-read *Lot* and have come to the conclusion that Fort was a harmless man who thought himself right and the world wrong. How about republishing Strange Tales?

Hoping this gets into Brass Tacks so that the shavetoppers who kick about rough edges can read it.—Lyman Martin, 60 Howe Street, Marlboro, Massachusetts.

Second The Motion

Dear Editor:

This is the first letter I have sent you and I wish to compliment your magazine highly. I read every science-fiction magazine on the market and like yours best, but another is a close second. Perhaps you can dig up Dr. Keller for a good story. I would like to see a sequel to *The Legion of Space*.

I would like to know how I can join the SPACEMEN. How about some interplanetary stories?—Edward Davis, 2376113676 EMF Am. Place, Brooklyn, N. York, Sandy, Plate? 167th Universe.

Anything Else?

Dear Editor:

I, for one, am vehemently opposed to your new policy, and thought-variant novelettes. You see I have a bad case of insomnia, and in the past I read Astounding Stories, which never failed to induce a deep slumber, in less than thirty minutes after I had begun to read it. But since the magazine has changed ownership, the stories have become so vital and absorbing, that I am unable to sleep and am kept up half the night. Won't you go back to the dry and stereotyped yarn so that a faithful reader can catch up on his sleep? If you let me down now, I'll be compelled to use some other magazine for a soporific. Some of the changes I desire are: That Astounding Stories should become a semimonthly, should have a companion magazine, such as the "Thinker" which has been suggested previously. It should have a sister magazine such as Strange Tales, also a quarterly, and should have flat edges, and be delivered wrapped in cellophane.

Wishing you the best of luck in your enterprises, I am—Kenneth Sterling, D. T. G.

The Spirit of '35.

Dear Editor:

Of late, I have been reading Astounding Stories more steadily than is my wont. There is a reason, naturally. The periodical improved

with every issue. Your authors are no longer doing pot-boilers, rather, they are writing fiction the style and originality of which almost entitles them to be termed literature.

Somehow, I have always disliked your artists—except of late. What's come over the old magazine? Is it the spirit of '25; or just Street & Smith's policy? Anyhow, congratulations from a colleague.

May I take this opportunity of inviting all amateur and professional writers to submit to "Author, Poet and Playwrite"? I should be glad to furnish detailed information if written to. I know they'll be interested.

I would also like to say that I have a number of manuscripts, letters, and special editions which I would like to swap with other readers. Willing to buy or sell, too. Likewise, science-fiction periodicals and books, etc.

I don't care for serials. Short stories are my meat. What I would very much like to see would be an issue of all short stories by the following writers: Schachner, Wandrei, Starr, Hal K. Wells, C. A. Smith, Graham, Cobbett, Keller, R. H. Gallun, and plenty of Ellers. Also some poetry. Couldn't you do away with serials by running a 25,000-word novelette every month instead?

The type of stories which appeal to me principally are the thought-variant tales. In fact, anything well written containing a plot which is different. I'm heartily sick of good heroes and bad villains ending in the former's triumph and the latter's discomfiture.

Please don't go in for reprints except in pamphlets sold individually. Most of us have already read Poe, Wells, Verne, etc. Those who haven't can secure their work from the public libraries. Why not a quarterly—or is business too bad?—Simpson M. Ritter, 911 Tiffany Street, New York, N. Y.

Air Fish?

Dear Editor:

Tell K. van Kampen he's crazy. In breaking his (?) law of conservation of energy he ran right plunk into another law, which is a little harder to break than our friend the law of conservation of energy. That law is the law of perpetual motion, which says that it is impossible to generate as much or more power than you use, or words to that effect. Van Kampen seems to forget that Barret's rocket-powered plane would use power also. Also there is no plastic, synthetic, or otherwise, which will stand the pressure of the air inside the ship. You can prove by figures that fish were originally made to live in the air. I challenge Mr. van Kampen to prove by experiment that a fish's natural environment is air, or, that that masterpiece of a mind mentally deranged, *The Irrelevant* disproved the law of conservation of energy. If you change to a semimonthly, I "kvit."—I Yams Eschelon, Citizen No. (X+X)²(3+6), 702 Griffith Avenue, Owensboro, Kentucky.

How About It, Mr. van Kampen?

Dear Editor:

Nothing that the arguments on *The Irrelevant* were continuing at a rapid pace, and getting apparently nowhere, I decided to write this, my second letter to Astounding Stories, and give my opinion.

I have just read Mr. Kaletsky's argument and have noted that it, like all the others presented, does not prove that the law of conservation of energy was not blasted. They all have proved merely that only a small amount of electrical energy would be produced or have attacked a few of Mr. van Kampen's other statements which do not definitely affect the main argument.

The reason for this is that all the forces which would act on the power ship were not taken into account. The main thing which was neglected was Lenz's Law. This law states that the current induced in a conductor by a magnetic field flows in such a direction that its magnetic field opposes the changes of conditions giving rise to the induced current. In this case, the tendency would be to oppose the motion of the ship in such a way that to compensate for the electric current produced in the ship's coils the ship would be slowed down proportionately.

I hope that you will bring this to the attention of Mr. van Kampen, as I am sure it will convince him that the law of conservation of energy has not been crushed. I will be willing to answer any return argument which he might offer.—Edward Hart, 140 Vermilyea Avenue, New York, N. Y.

A Space Pilot

Dear Editor:

This is my first letter to Astounding, although I have been reading it for years.

I want to congratulate you on the finest magazine ever published, and seeing that every one else is airing his grievances, I might as well air mine—which is *Lo!* of course.

My pet dream is that some day man will conquer space, and Mr. Furt's remarkable document blows up the whole works. It simply can't be allowed.

I have no bones to pick with your stories, as I read them over and over and drive my family mad, because when they are talking of something they consider important, and expect I am listening, I am a hundred million miles out in space, and blissfully unconscious of anything else except the controls of my space liner. Alackaday! All too soon we return to earth.

Please keep up your fine stories and don't let them slack off. Why doesn't some one invent something to get us off this globe? It is a horrible thought to think we will all be dead and gone before they do.—Evelits Cudin, 49 Medford Street, Malden, Massachusetts.

"Old Faithful" *A Classic*

Dear Editor:

I have procrastinated this letter for quite a lengthy time but I just had to get these few comments and suggestions out of my mind before I burst with overjoy. I think that our magazine is swell. In fact, I know it is. The present list of authors is swellegant, although it lacks one outstanding author and that is Vaughan. I think his stories more interesting than those of E. E. Smith. By all means, get Vaughan. As for the stories, they are up to a very high standard but occasionally a few bad ones creep in. Please stop printing Frank Belknap Long's stories. I don't like them.

Van Kampen sure did stir up a lot of dust with his story, *The Irrelevant*. I thought it was superb, although I do not usually enjoy his stories. I have acquired a keen sense of satisfaction from the stories of Gallun. I think that *Old Faithful* was one of the best stories I have ever read. It should be placed among the classics of scientifiction. *The Skylark of Valeron* wasn't all that I expected but I enjoyed it exceedingly. *The Legion of Space* was an excellent story. I got an extreme kick out of it. As to Weinbaum's stories, words cannot explain the reaction they have on me. They seem to act as an opiate and lull me into a sort of dreamy slumber. More from Weinbaum, and Williamson, too. *The Nightfall Machine* is progressing slowly, but I cannot comment on it until I read the last chapters.

I am in accordance with Mr. Wolheim's suggestion that you publish a wild-and-woolly science-adventure magazine and call it "The Planeteer." I am also in favor of Astounding being published twice a month if you can keep up the present standard. And please give us a quarterly.

As this is my first letter to any scientifiction magazine, I would like to see it published in Brass Tacks, if it is possible. I am one of your younger readers as I am only sixteen.—Walter Liebscher, Box 371, Mount Olive, Illinois.

How About Seconds?

Dear Editor:

So a new menace has arisen. What menace you say? Why the SPWSSTFM, of course. But this time they have gone too far. Their insidious propaganda is a menace to the very foundation of science magazines. The wire staples. Come brothers, arise in your wrath and smite down these unbelievers. Remember the long years of faithful service given to us by these same faithful staples. And as for you, Master Tucker, I take it upon myself to avenge the honor of ye olde wire staples. If you so desire, I shall meet you in martial combat with either squirt guns or cap pistols—take your choice.

And now to a more serious topic. I think the February issue, as a whole, was better than the March issue. In the latter, *Frozone Crotourt, Mind of the World* and *When the Sun Dies* were all very good. The rest, with the exception of Campbell, Jr.'s story were only average, and one, *No Medals*, was punk.

Leinster is one of the few authors who turns out consistently good stories. I'll close now with best wishes to Astounding, and a final plea to the loyal advocates of the wire staples. Down with Dictator Tucker!—Chauncey Ellsworth McGeehee, III.

"Foot Pounds"

Dear Editor:

Having secured three new readers for Astounding Stories and read your invitation to comment on *The Irrelevant*, I herewith submit my first letter to Brass Tacks.

The Skylark of Valeron is the most fantastic of all fantastic literature ever written. I am disappointed with it. E. E. Smith is probably the main drawing card to the story. I do hope that you are not going in for the practice of bringing your readers big names instead of big stories.

I wish to give you the names of what I believe to be the most outstanding and the worst stories you have printed. There are more outstanding stories than bad ones.

Most outstanding:

He From Procyon, The Legion of Space, Err, Warriors of Eternity, The Bright Illusion, The Mightiest Machine—so far—*Discus Men of Ekis.*

Worst:

The Tooth, The Thing in the Pond, Lo! Beyond the Spectrum, Dimension of the Conquered, and *Gas, the Killer.*

And now to Mr. Karl van Kampen. You state that the gases propelling the rocket ships, relative to the Earth, did 30,000 foot pounds of work—right. But, you then say, "the ship was traveling 15,000 miles a second, relative to the more distant nebula" and so did "79,200,000,000 foot pounds of work from ten pounds of hydrogen gas."

Your mathematics I do not question, but the term "foot pounds" I do, and I shall attempt to show you why.

As long as the space ship is travelling relative to the Earth, "foot pounds" is all right to use, but when the ship travels relative to anything outside of the Earth, the term "foot pounds" ceases to exist in computing the work done by the gas in the rocket.

A pound is a pound only on Earth—even at that it varies. A foot is a foot only on Earth. However, my main objection to the term "foot pounds" as you used it, is the word "pounds." A pound can exist only when used relative to the Earth. A pound of butter, feathers, or rocks would not weigh a pound on Mars, Pluto, Venus or the Sun, and so you cannot speak of work as being "foot pounds" unless that work is relative to the Earth.

If you object and say that a foot pound is merely an expression used to name the amount of work done by something, or some one, I shall be obliged to say that the expression was invented by the weak, futile minds of Earthlings to be used in conjunction with the Earth and being for that purpose, cannot be used in conjunction with another planet—let alone a "distant nebula."

In one of your letters, you state that gravity must be ignored to work the problem. If we ignore gravity, it ceases to exist for us. If it ceases to exist for us, there is no such thing as a pound. Weight depends on gravity. If there is no such thing as a pound, you still can't use the term "foot pounds," in conjunction with the Earth, or even a "distant nebula" because such an expression would be meaningless.

One of us is wrong; and until you prove me to be wrong, I'm right.—Kenneth Harrison, 72 Laurel Street, Ashland, Oregon.

Chewing Gum!

Dear Editor:

The SPWSSTFM speaks again: Hearken!

During our recent—and present—campaign to rid your and our magazine of those despicable wire staples, quite a lot of questions arose regarding the same. Two questions I herewith answer.

Question 1 was: *My sanity.*

I herewith take space and time to assure all readers that I am sane, thus disappointing a lot of you, I know. It also will disappoint no few editors to learn that fact, for my secret service has tipped me off that two certain editors have started pulling strings to have me deported back to Missouri. Question 2 was: How does he intend to hold the magazine together without the wire staples?

And the answer is simple. By recent vote among us, we have decided this: Magazines shall hereafter bind together their pages with chewing gum, the upper half of spearmint flavor, the lower half of peppermint flavor, so that readers, after swallowing the tales within the covers, can pick their favorite gum off the binding edge and chew it, thus helping to digest those above-mentioned tales. Every six months, the magazine shall change flavors of gum, new flavors to be decided upon by our society. So, dear readers, the next copy of Astounding Stories that you buy will be stuck together with chewing gum, and not staples. Watch for it!—Bob (Dictator) Tucker, 210 East Grove Street, Bloomington, Illinois.

Thanks!

Dear Editor:

Astounding Stories is the science-fiction magazine!

Although a casual reader of science-fiction for some years, I read—rather devoured—my first copy of Astounding Stories in late November of last year. I have purchased every issue since. As to your competitors—you have none. Their standard is so far below Astounding's that they are not in the same class.

Regarding the semimonthly: It seems almost too good to be true. By all means let's have it, if the high quality of the present issues is not lowered. A semimonthly would require twice as many stories per year. Can your authors supply that many good stories? I'd rather have the present great monthly than an inferior semimonthly. Have you ever seriously considered a quarterly? It would be less of a story drain than a semimonthly, but would enable you to grab good stories which you would otherwise be forced to pass up through lack of space in a monthly.—Richard H. Jamison, 5141 Dresden Avenue, St. Louis, Missouri.